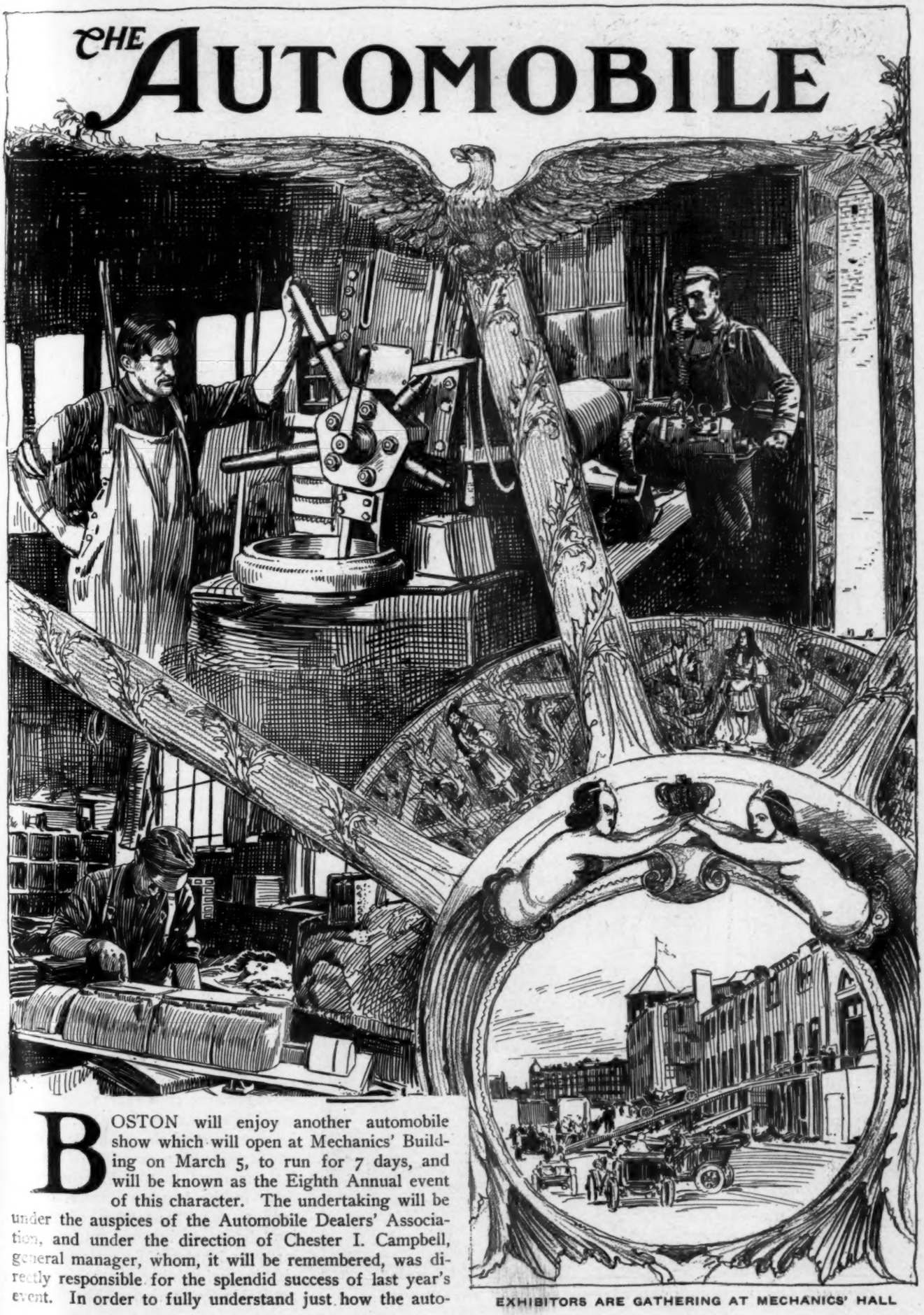
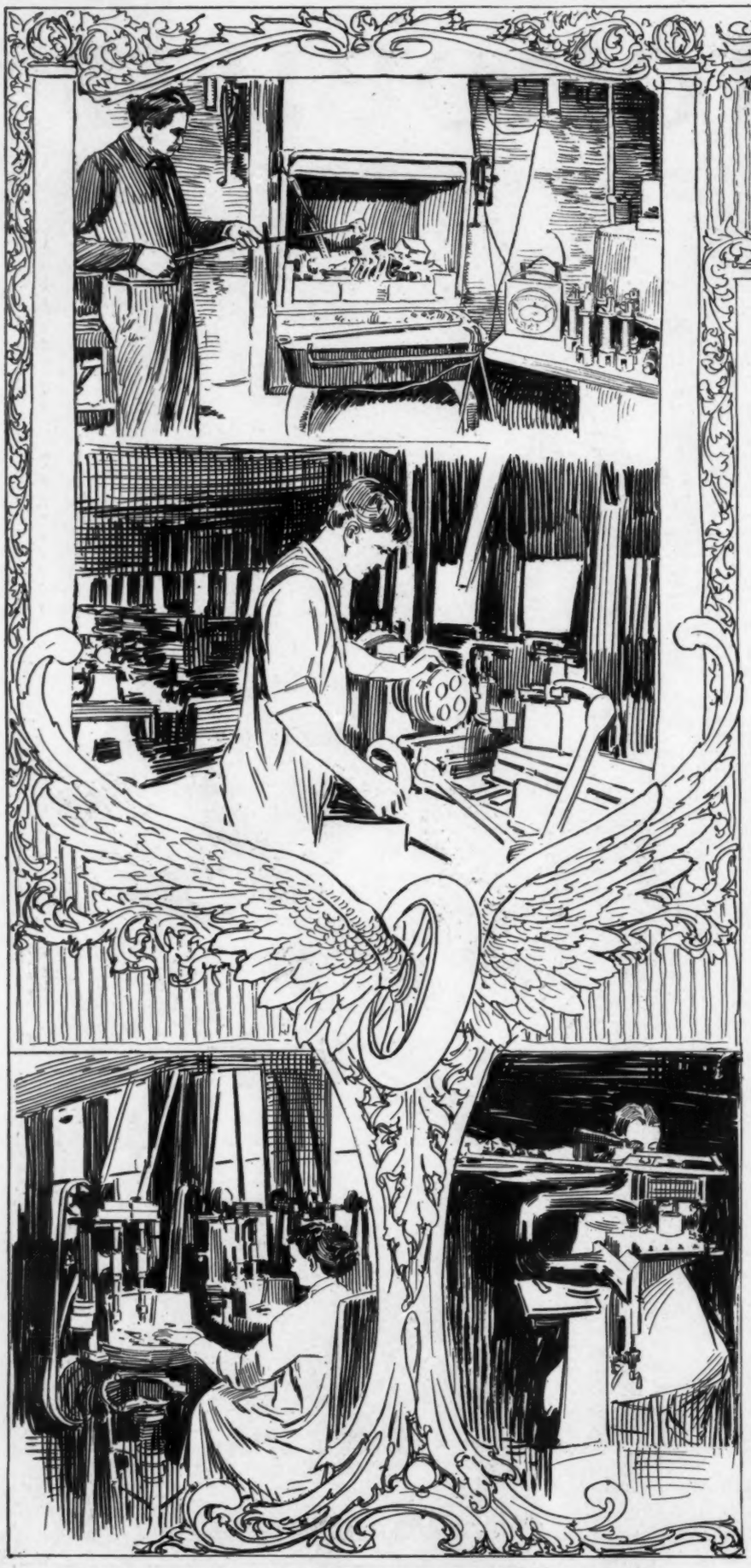
VOL. XXII NEW YORK—THURSDAY, MARCH 3, 1910—CHICAGO No. 9

# THE AUTOMOBILE



BOSTON will enjoy another automobile show which will open at Mechanics' Building on March 5, to run for 7 days, and will be known as the Eighth Annual event of this character. The undertaking will be under the auspices of the Automobile Dealers' Association, and under the direction of Chester I. Campbell, general manager, whom, it will be remembered, was directly responsible for the splendid success of last year's event. In order to fully understand just how the auto-

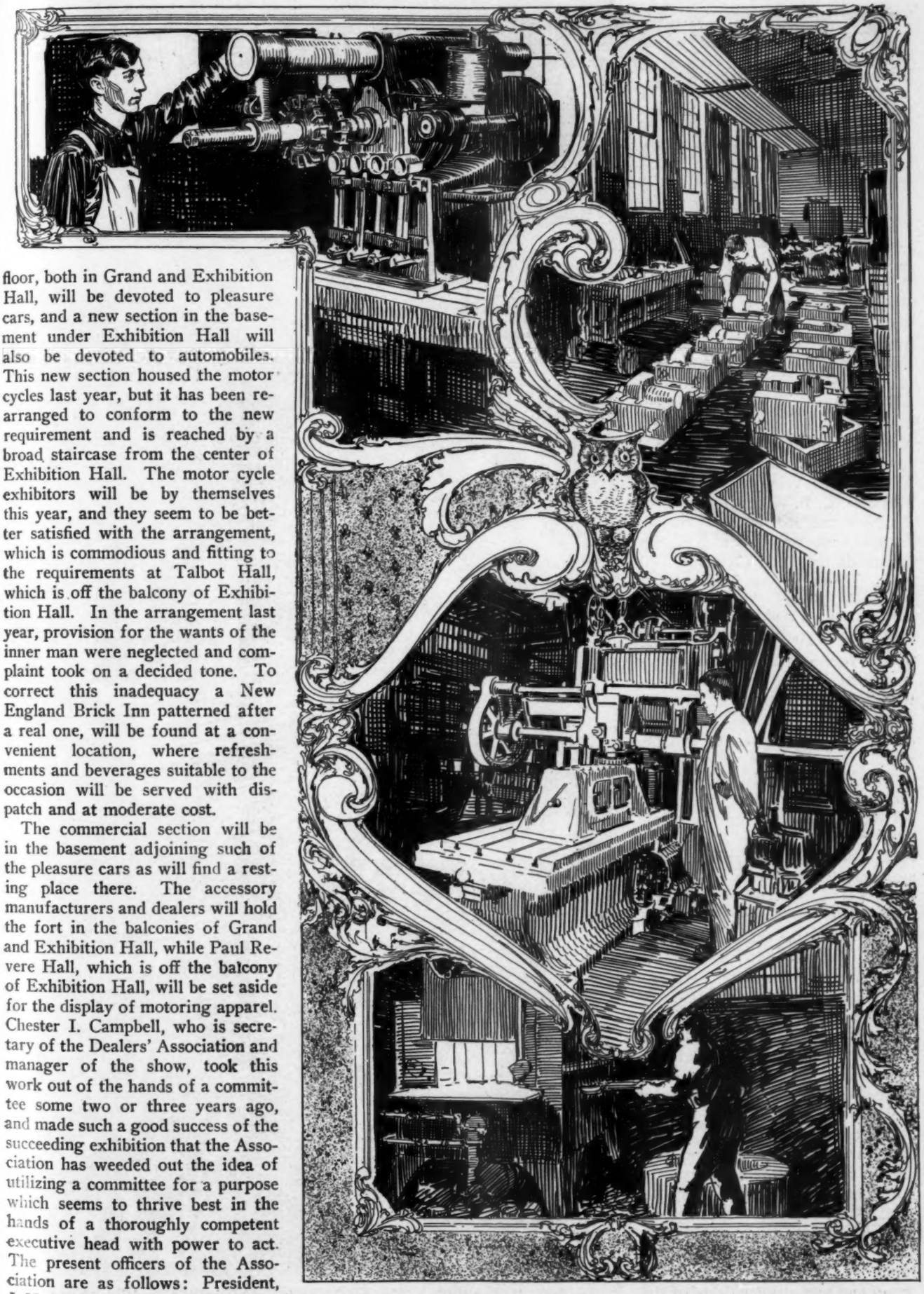
EXHIBITORS ARE GATHERING AT MECHANICS' HALL



DYNAMIC ABILITY IS INDUCED BY PROPER HEAT TREATMENT

mobile industry has grown and prospered throughout New England it will be essential to observe that at the show last year there were 86 makes of automobiles and 174 accessory exhibits, making a total of 260 exhibitions, whereas this year there will be a minimum of 280 exhibitions, but the actual number of cars will be increased at least 50 per cent. Boston alone has over 100 automobile agencies in the pleasure class, a round dozen representing commercial automobiles, and in the accessory line Boston is headquarters for all New England.

Instead of scouring Europe for an art motif which was the feat last year, the scheme of decoration will, in some measure, duplicate the effort which was made at the Coliseum in Chicago, with many differences as to detail. The background will be a typical New England scene, rather rugged in its character, but the effect will be softened by a mural and garden effect in which an adjoining apple orchard will occupy a position of prominence. A certain uniformity, which was characteristic of all decorative schemes for Boston shows, will be retained. The arrangement as it obtained last year will prevail, excepting that a few economies of space have been effected, thus making it possible to crowd in the additional exhibitions of which the demand far exceeds the space available. This latter situation is not confined to Boston. All show managements this year were pestered by applicants for space, greatly in excess of the available area, and it becomes a question of some little moment as to what shall be done in the long run, since, contrary to some expressions of opinion, shows are increasing in popularity and automobile makers persist in maintaining that they are profitable institutions. The main



FOUNDRY METHODS ADVANCED TO AUTOMOBILE REQUIREMENTS

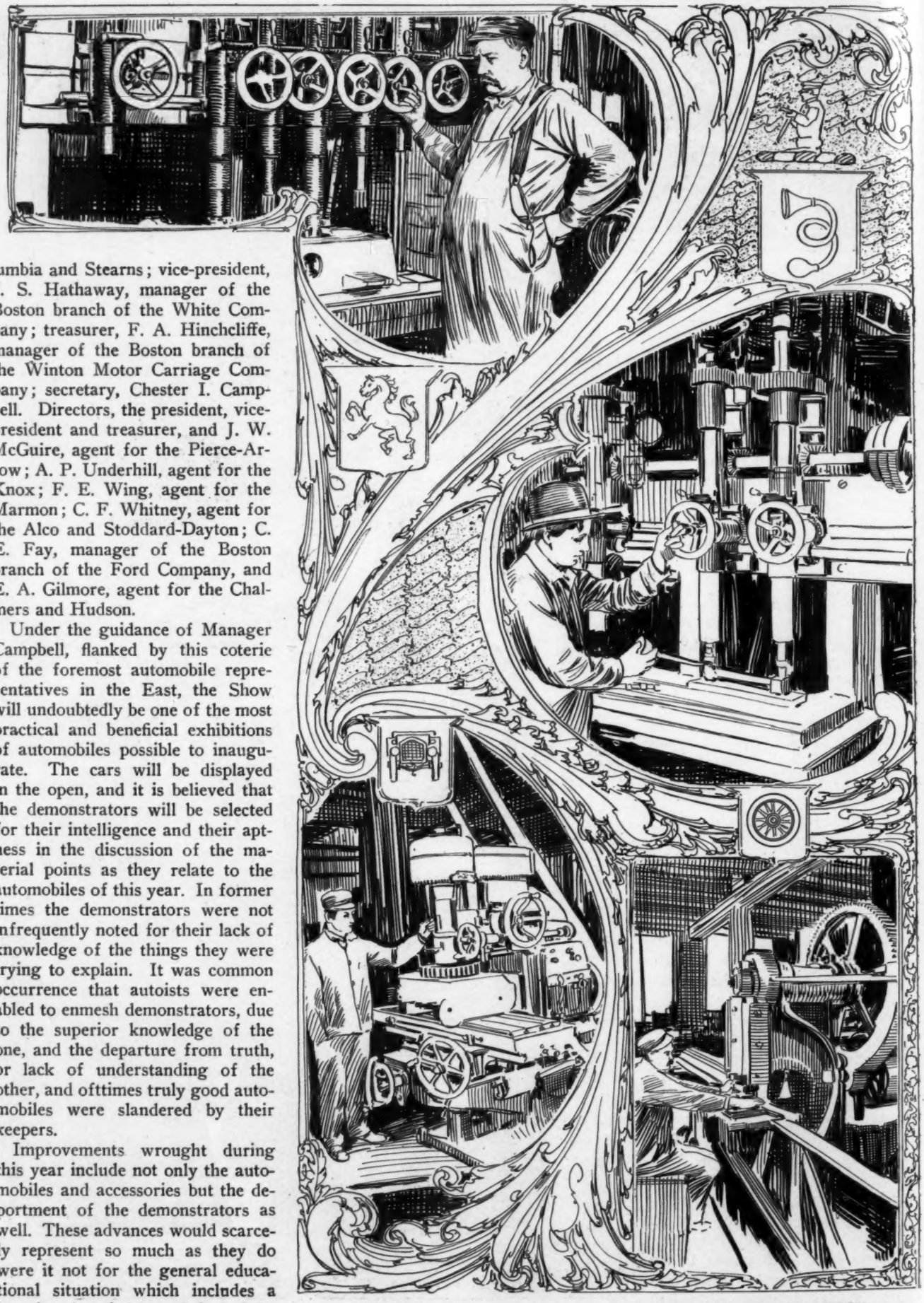
floor, both in Grand and Exhibition Hall, will be devoted to pleasure cars, and a new section in the basement under Exhibition Hall will also be devoted to automobiles. This new section housed the motor cycles last year, but it has been rearranged to conform to the new requirement and is reached by a broad staircase from the center of Exhibition Hall. The motor cycle exhibitors will be by themselves this year, and they seem to be better satisfied with the arrangement, which is commodious and fitting to the requirements at Talbot Hall, which is off the balcony of Exhibition Hall. In the arrangement last year, provision for the wants of the inner man were neglected and complaint took on a decided tone. To correct this inadequacy a New England Brick Inn patterned after a real one, will be found at a convenient location, where refreshments and beverages suitable to the occasion will be served with dispatch and at moderate cost.

The commercial section will be in the basement adjoining such of the pleasure cars as will find a resting place there. The accessory manufacturers and dealers will hold the fort in the balconies of Grand and Exhibition Hall, while Paul Revere Hall, which is off the balcony of Exhibition Hall, will be set aside for the display of motoring apparel. Chester I. Campbell, who is secretary of the Dealers' Association and manager of the show, took this work out of the hands of a committee some two or three years ago, and made such a good success of the succeeding exhibition that the Association has weeded out the idea of utilizing a committee for a purpose which seems to thrive best in the hands of a thoroughly competent executive head with power to act. The present officers of the Association are as follows: President, J. H. MacAlman, agent for the Co-

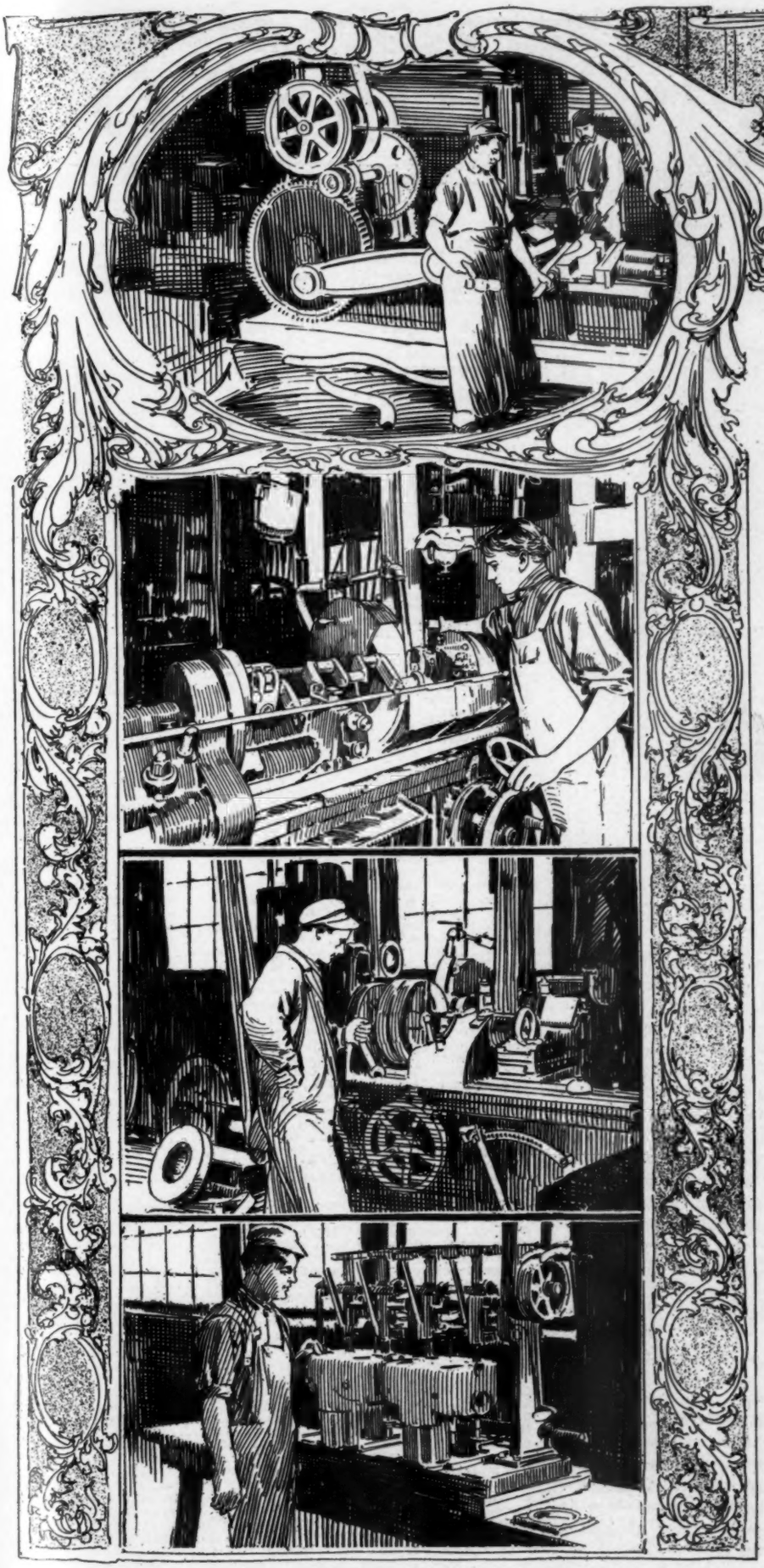
lumbia and Stearns; vice-president, J. S. Hathaway, manager of the Boston branch of the White Company; treasurer, F. A. Hinchcliffe, manager of the Boston branch of the Winton Motor Carriage Company; secretary, Chester I. Campbell. Directors, the president, vice-president and treasurer, and J. W. McGuire, agent for the Pierce-Arrow; A. P. Underhill, agent for the Knox; F. E. Wing, agent for the Marmon; C. F. Whitney, agent for the Alco and Stoddard-Dayton; C. E. Fay, manager of the Boston branch of the Ford Company, and E. A. Gilmore, agent for the Chalmers and Hudson.

Under the guidance of Manager Campbell, flanked by this coterie of the foremost automobile representatives in the East, the Show will undoubtedly be one of the most practical and beneficial exhibitions of automobiles possible to inaugurate. The cars will be displayed in the open, and it is believed that the demonstrators will be selected for their intelligence and their aptness in the discussion of the material points as they relate to the automobiles of this year. In former times the demonstrators were not infrequently noted for their lack of knowledge of the things they were trying to explain. It was common occurrence that autoists were enabled to enmesh demonstrators, due to the superior knowledge of the one, and the departure from truth, or lack of understanding of the other, and ofttimes truly good automobiles were slandered by their keepers.

Improvements wrought during this year include not only the automobiles and accessories but the deportment of the demonstrators as well. These advances would scarcely represent so much as they do were it not for the general educational situation which includes a broad and varied knowledge of the



MULTIPLE SPINDLE TOOLS ADD SPEED AND INDICATE ACCURACY



GRINDING PROCESSES REDUCE LIMITS OF TOLERANCE

mechanical intricacies of the automobile on the part of the autoing public. In former times, prospective purchasers of automobiles were wont to attach their faith to apparently nice selling points, but they have learned the story over again, which is so aptly put in the paraphrase, "one swallow does not make a summer."

What they expect to find in the 1910 automobile situation is noiseless performance, interchangeability, a certain get-at-able-ness, and the facility which will enable them to overhaul the automobiles without having to use a variety of special wrenches which are so prone to stray away and leave one in the lurch by the roadside, distant from a repair shop.

Despite the apparently critical attitude of the patrons, it is believed that they will be more sensible and tolerant, but they will not exhibit the rare quality which was once present in a King of Spain who thought that if he had the making of the world he could have done it better. It is now common belief that the automobile is sufficiently near a conventional state in point of design so that buyers will hardly have to inflict their ideals upon the makers, and they will confine themselves during selection to the questions which will be reflected by their own needs.

There is a little curiosity expressed among autoists in general bearing upon the attitude which the New England will assume in relation to torpedo body work and a few of the other ideas which dominate the present situation. So far this type of body has received favorable comment and it is claimed by makers that it is here to stay. Mechanically, the situation is less likely to be judged as otherwise than favorable, since the changes are less radical following along defined lines well executed.

# BOSTON

CHESTER I. CAMPBELL
MANAGER BOSTON SHOW

New England, as the home of the Industrial Arts, becomes the court of last resort, and the makers of automobiles display wisdom in its serenest form, when they bring the best of their wares and lay them down in Mechanics' Hall to be judged. That they will be critically examined and passed upon in accordance with their respective merits, to the prejudice of none, is a conclusion which it is safe to draw, and which is reflected in the every day life as it is viewed in perspective.

It will be important to the exhibitors to make their representations in conservative and fitting language. They will find the audience intelligently critical, observing, and tolerant. They will want to know the reasons why the innovations are given a resting place instead of contrivances which may have served them faithfully, and they will look for accessibility as they never did before. The makers have had their say, and they promised interchangeability in the automobiles of the year. The Boston autoist, instead of reflecting the characteristics of the man from Missouri who wants to be shown, will look for himself, and his experience will be sufficient for his wants.

It is confidentially expected that the Boston critic will find many things to satisfy him among the new automobiles and the many phases of the accessory situation. The materials employed this year are the result of long deliberation and have been reduced to a standard at the behest of engineers of skill and discrimination. The machining processes are the direct result of automobile engineering in its most advanced form, some of the most capable of which have been suggested here in sketches taken from life, with the avowed object of hinting to buyers something of the underlying situation.

# EXHIBITORS

Fiat Repair Co., 199 Berkeley St..... 309
Firestone Tire & Rubber Co., Akron, O..... 506, 507
Fisk Rubber Co., The, Chicopee Falls, Mass..... 436
Flentje, Ernest, Cambridge, Mass..... 532AA
Forbes, W. J., 70 Long Wharf..... 620
Ford Co., Percy 226 Columbus Ave..... 400, 407, Inc.
Ford Motor Co., 149 Columbus Ave..... 118, 119
Fox Metallic Tire Belt Co., Brooklyn, N. Y..... 530
Franklin Automobile Co., 671 Boylston St..... 128, 129
Fuller, Alvan T., Park Sq..... 1, 2, 247, 248

G & J Tire Co., Indianapolis, Ind..... 556, 557
Gabriel Horn Mfg. Co., Cleveland, O..... 444, 445
Gasoline Motor Efficiency Co., Jersey City, N. J..... 570
General Vehicle Co., 84 State St..... 236, 237, 238
Gilbert Mfg. Co., New Haven, Conn..... 558
Goodrich Co., The B. F., 851 Boylston St..... 540, 541
Goodyear Tire & Rubber Co., 669 Boylston St..... 534, 536
Gramm Motor Car Co., 222 Eliot St..... 231, 232
Gray & Davis, Amesbury, Mass..... 433
Grout Auto Co., 218 Eliot St..... 360, 361, 362

H. I. K. Co., 116 Bedford St..... 220A
Harriman Engine Co., 53 State St..... 304, 305, 306, 307
Harris Oil Co., A. W., Providence, R. I..... 519, 520
Hartford Rubber Works Co., Hartford, Conn..... 537, 538
Hartford Suspension Co., 150 Bay St., Jersey City, N. J..... 542
Harvey Co., Arthur C., 374 Congress St..... 224
Havoline Oil Co., 749 Boylston St..... 559
Heinze Electrical Co., Lowell, Mass..... 536
Henderson-Lowe Co., 75 Massachusetts Ave..... 154, 155
Hendee Mfg. Co., Springfield, Mass..... 572, 573, 574
Henshaw, C. S., 228 Columbus Ave..... 24, 25
Herz & Co., Lafayette St., New York City..... 513
Hillman Auto Supply Co., 98 Massachusetts Ave..... 531
Hilton Mfg. Co., 15 State St..... 343
Holt & Beebe, 40 Sudbury St..... 357, a, a
Hol-Tan Co., The, 66 Hereford St..... 113
Hoffecker Co., The, 222 Eliot St..... 516, 517
Hopewell Bros., Newton, Mass..... 509A
"Horseless Age," New York City..... 47
Howard Detachable Rim Co., Trenton, N. J..... 359
Hub Auto Renting Co., 366A Columbus Ave..... 363, 364
Hudson-Colby Co., 122 Massachusetts Ave..... 349, 350
Hydraulic Oil Storage Co., 25 Broad St., New York City..... 336

Isotta Import Co., 24 Cambria St..... 652

Jacobs, Volney J., 887 Boylston St..... 333, 334
Jeffery & Co., Thos. B., 90 Massachusetts Ave..... 106, 107
Jenkins & Co., W. M., 286 Columbus Ave..... 21, 22
Jones Speedometer Co., Seventy-sixth St., New York City..... 502
Jordan, R. W., 8 Belvidere St..... 314, a, a

Kellom & Co., Chas. F., 113 Arch St..... 623
Kemble, A. M., Greenwich, Conn..... 451, a, a
Kempshall Tire Co., 585 Boylston St..... 570, a
Kennedy Carbureter Co., 226 Columbus Ave..... 402
Keystone Lubricating Co., Philadelphia, Pa..... 332
KisselKar Co., 741 Boylston St..... 1a, 2a
Kilgore Mfg. Co., 585 Boylston St..... 604
Knapp-Greenwood Co., 1000 Boylston St..... 615

Lavolette Co., New York City..... 413
Leather Tire Goods Co., Niagara Falls, N. Y..... 544
Leland & Co., W. H., Worcester, Mass..... 417
Linscott Motor Co., 163 Columbus Ave..... 120, 121, 130
Locomobile Co. of America, 589 Boylston St..... 111, 112
Lovell-McConnell Mfg. Co., Newark, N. J..... 415, a
Lunt-Moss Co., 43 S. Market St..... 320
Lyon Non-Skid Co., 435 N. Broad St., Philadelphia..... 358, a, a

MacAlman, J. H., 96 Massachusetts Ave..... 124, 125, 126, 127
Maching, Theo. H., New York City..... 352
Maguire Co., J. W., 743 Boylston St..... 14, 18
Martin Carriage Works, York, Pa..... 328
Matheson Auto Co., 823 Boylston St..... 103, 104
McCue Co., The, Hartford, Conn..... 152, 153
Merkel Light Motor Co., Pottstown, Pa..... 581, 582
Metcalf Machine Works, Geo. A., Woonsocket, R. I..... 355, B
Mezger, Inc., C. A., Seventy-sixth and B'way, New York City 504
Miami Cycle & Mfg. Co., Middletown, O..... 579
Miller, Chas. E., 97 Reade St., New York City..... 566
Michelin Tire Co., Milltown, N. J..... 418
Moore, Smith Co., 250 Devonshire St..... 651
Morgan, R. L., Co., Worcester, Mass..... 322
Morgan & Wright, Detroit, Mich..... 438
"Motor," 2 Duane St., New York..... 46
"Motor Age," 1200 Michigan Ave..... 50
Motor Print, Philadelphia..... 38
Motor Specialties Co., 8 Motor Mart..... 301
"Motor Vehicle," New York City..... 329, a, a
"Motor World," New York City..... 51
Mutty, L. J., & Co., 91 Federal St..... 609
Murray Co., P. A., Newton, Mass..... 308, 324

National Carbon Co., Cleveland, O..... 439
N. Y. & N. J. Lubricant Co., 165 Broadway, New York City 503
Neale, A. F., 10 Motor Mart..... 331
New England Auto Journal, Pawtucket, R. I..... 48
Nichols & Co., D. P., 5 Edgewood St., Roxbury. 209, 210, 211, 212, 213
Nightingale Whistle Co., 1777 Broadway, New York City.. 614, 625
Noonan Tool & Machine Co., Rome, N. Y..... 355, a

Olds-Oakland Co., Massachusetts Ave..... 109
Oulton Motor & Mfg. Co., 311 Atlantic Ave..... 246
Oakley Steel Foundry, Millbury, Mass..... 429, a

Panhard Oil, 226 Columbus Ave..... 407
Park Sq. Auto Station, 443 Columbus Ave..... 13, 17, C, 231
Parker Motor Co., Hartford, Conn..... 352
Parker & Co., F. R., 243 Columbus Ave..... 150, a, 351
Panhard Oil, 226 Columbus Ave..... 407
Pantasote Co., The, 11 Broadway, New York City..... 523, 524
Peerless Motor Car Co., 178 Columbus Ave..... 12, 16
Pennsylvania Rubber Co. of New York, Jeanette, Pa..... 423
Perfection Wrench Co., Port Chester, N. Y..... 616
Pierce Cycle Co., The, Buffalo, N. Y..... 575, 576
Pittsfield Spark Coil Co., Dalton, Mass..... 431
Pittsburg Auto Equipment Co., Beatty St., Pittsburgh..... 564, B
Poison, W. F., Buffalo, N. Y..... 410, 411
Pope Mfg. Co., Hartford, Conn..... 215
Post & Lester Co., 288 Devonshire St..... 424
Premier Motor Car Co. of N. E., 1008 Boylston St..... 42
Proctor Supply Co., G. H., 25 Irvington St..... 100, 243

R. I. V. Bearings, New York City..... 406
Rainier Co., The, 587 Boylston St..... 156
Randall-Faichney Co., The, 251 Causeway St..... 512
Rausch & Lang Carriage Co., Cleveland, O..... 330
Rayvello Chemical Co., Malden, Mass..... 351a, a
Reading Standard Co., Reading, Pa..... 606, 607
Regal Motor Co., 12 Park Sq..... 151
Reliance Motor Car Co., Owosso, Mich..... 250, 251
Reliance Motorcycle Co., Owego, N. Y..... 580
Reliance Speedometer Co., 134 Eliot St..... 426a
Remy Electric Co., Anderson, Ind..... 547, 548
Republic Rubber Co., Youngstown, O..... 545
Robinson & Son Co., 44 Commercial St..... 525
Rogers, Leo N., 264 Warwick St., Roxbury..... 367
Russell & Co., W. L., 169 Huntington Ave..... 20
Russell, T. F., & Co., 176 Federal St..... 427a, a
Rutherford Rubber Co., Rutherford, N. J..... 622

S. M. Supplies Co., The, 22-24 Lincoln St..... 136, 142
Sage Trunk Co., 144 High St..... 609a, a
Salman Co., John A., 21 Bromfield St..... 447
Sampson Mfg. Co., Alden, Pittsfield, Mass..... 319, 323
Sanders, N. S. H., 173 Huntington Ave..... 133
Sawyer Oil Co., Howard B., 65 Long Wharf..... 366
Schacht Mfg. Co., Cincinnati, O..... 222
Seamless Rubber Co., New Haven, Conn..... 532
Selden Motor Car Co., 801 Boylston St..... 135
Shawmut Tire Co., 103 Bedford St..... 450, 451
Simmons, Hatch & Whitten Co., 141 Milk St..... 654
Sireno Co., New York City..... 610, 611
Smith Co., Wm. J., New Haven, Conn..... 414, B
Smith, Fred S., 38 Columbus Ave..... 15
South End Motor Car Co., 24 E. Concord St..... 315, 316
Splitdorf, C. F., New York City..... 422
Stackpole Battery Co., St. Mary's, Pa..... 414a, 3
Standard Motor Car Co., 224 Pleasant St..... 339, 348
Standard Thermometer Co., 65 Shirley St., Roxbury..... 428B
Standard Tire & Rubber Co., 102 Portland St..... 500A
Standard Welding Co., Cleveland, O..... 421
Stanley Motor Carriage Co., Newton, Mass..... 19
Star Auto Locks, 53 State St..... 220, B
Sterling Hardware Co., 10 Warren St., New York City..... 358
Stevens-Sowers Motor Car Co., 821 Boylston St..... 23
Stromberg Motor Devices Co., 1253 Mich. Ave., Chicago. 551, 552, 553
Studebaker Bros. Co. of N. Y., 1020 Boylston St.. 40, 41, 218, 219
Suburban Concrete Block Co., Somerville, Mass..... 368
Swinehart Tire & Rubber Co., Akron, O..... 543

Thomas Motor Co., E. R., 587 Boylston St..... 655
Tyler, Frank J., 121 Massachusetts Ave..... 116, 117, 134

U. S. Light & Heating Co., 84 State St..... 546
Underhay Oil Co., 73 Batterymarch St..... 621
Underhill Co., The, 222 Columbus Ave..... 6, 10, 241, 242

Vacuum Oil Co., Rochester, N. Y..... 521, 522
Valentine & Co., 74 Pearl St..... 533
Veeder Mfg. Co., Hartford, Conn..... 437
Victor Auto Supply Co., New York City..... 511
Victor Metals Co., Braintree, Mass..... 329
Voorhees Rubber Co., Jersey City, N. J..... 613

Warner Gear Co., Muncie, Ind..... 415
Warner Instrument Co., 925 Boylston St..... 435
Ward & Sons, E. T., 23 Purchase St..... 122, 123
Weed Chain & Tire Grip Co., New York City..... 505
Westinghouse Electrical & Mfg. Co., Pittsburgh..... 356, 357
White Co., The, 320 Newbury St..... 5, 9, 216, 217
Whitten-Gilmore Co., The, 907 Boylston St..... 108, 109, 110
White, Ware & Co., 1024 Boylston St..... 317
Whittaker Chain & Tread Co., 12 Pearl St..... 553, a, a
White & Dagley Co., Worcester, Mass..... 425
Whitney Mfg. Co., Hartford, Conn..... 518
Wilkinson Co., A. J., 184 Washington St..... 560, 561
Wing, F. E., Motor Mart..... 122, 123
Winton Motor Carriage Co., 148 Berkeley St..... 4, 8
Y. M. C. A. Auto School, Boston..... 653

# Looking Ahead in the Automobile Industry

CONTEMPLATION of the future prospects and possible growth of the automobile industry is an occupation fraught with considerable danger; no other product of man's ingenuity has shown such a perverse tendency to confound all would-be critics. An example of this disposition will be afforded by a glance at the statistics of the industry printed in these columns but four weeks ago. In the article referred to tables were given of all the known companies engaged in manufacturing automobiles; the list totaled 211 names. In the four weeks following no less than 23 additional firms—more than 10 per cent—have been added to the ranks.

At the same time the total number of cars to be produced in this country during 1910 was estimated at 280,000, and at the time this seemed hardly a conservative figure. Since that time a great number of firms have increased their figures, and with the added product of the newcomers, it is inevitable that the total will run well over the 300,000 mark.

The standings of the various cities and States as centers of the industry have been considerably changed by these additions. Milwaukee, Wis., has been the scene of the greatest activity; it has, since the compilation of the last set of tables, acquired four companies manufacturing motor trucks and other commercial cars. These place it sixth in the list of cities ranked according to the number of firms, with a total roll-call of seven. St. Louis has been moved up to fifth by the acquisition of three new firms, one manufacturing pleasure cars and one both pleasure and commercial vehicles, which make its present total eight.

Chicago has become the home of three new companies, one for the production of pleasure cars and two for commercials, which give it a total of eleven and advance it to second place, ahead of Cleveland and Indianapolis, and second only to Detroit. This last city has had its roll increased by two, one making pleasure and one commercial cars, so that its number of factories now attains the comfortable figure of 25. Minneapolis, Minn., also has shown some activity, and has obtained two new plants.

**AMERICAN PRODUCTION BY YEARS**
**What May Be Expected from Continued Increase**

| | | Cars Produced | In Use |
|---|---|---|---|
| Figures known approximately | 1907 | 80,000 | 100,000 |
| | 1908 | 130,000 | 200,000 |
| | 1909 | 200,000 | 350,000 |
| | 1910 | 300,000 | 600,000 |
| Figures based on 50 per cent annual increase | 1911 | 450,000 | 1,000,000 |
| | 1912 | 675,000 | 1,600,000 |
| | 1913 | 1,012,000 | 2,500,000 |
| | 1914 | 1,519,000 | 3,800,000 |
| | 1915 | 2,278,000 | 5,900,000 |

During the past three or four years the number of automobiles produced in the United States has increased each successive year by some 50 per cent over the preceding year. The number for 1909 was in the neighborhood of 200,000; for 1910 it will inevitably exceed 300,000. Carrying on this line of thought, it is interesting to see just where this rate of increase, if constantly maintained, would land the industry. With an increase of 50 per cent over the 300,000 for 1910, 1911 should see 450,000 cars brought forth; for 1912 the figure would be 675,000, for 1913, 1,012,000, and so on.

Five years is a very reasonable expectation of life for a modern automobile; there are plenty of cars of the vintage of 1904 in every-day use at the persent time. On this basis, and assuming the rate of progress outlined above, the end of the year 1913 would find a total of 2,637,000 cars in use!

At first this sounds like the wildest speculation; but perhaps these figures will repay a short consideration. How many automobiles can the population of the United States use? There are many possibilities in such an inquiry.

It is a matter of common knowledge that there are in use in the United States at the present time more than 300,000 automobiles, and the demand still seems almost unlimited. When the additional 300,000 to be made this year are included, it will be seen that at the close of 1910 one person out of every 150 in the country will have an automobile, or one family out of every forty or fifty. Obviously the number of families capable of maintaining an automobile is comparatively limited, although the average is brought up by some who are able to support two or more. One family out of twenty seems about the ultimate limit, even considering the utmost possibilities of the $500 car.

The population of the country is increasing pretty rapidly, but not in a proportion to keep pace with the automobile product. Some time in the latter part of 1912, when, according to the schedule outlined above, there will be roughly a million and a half automobiles in use, the limiting ratio of one car to every 70 persons will be reached.

At that time the $500 car will have reached its perfection. With the great increase in the number of cars manufactured, and the consequent reduction in overhead charges and cost of material, the cars selling at that price will probably be very nearly what we now pay from $750 to $1,000 for. Barring the possibility of radical changes in design, it should be possible at that price to put on the market a four-cylinder car of 20 or 25 horsepower, seating four or five persons, with a wheelbase of not less than 100 inches, and 32 or 34-inch tires; these cars to be made in series of not less than 50,000.

When the million-and-a-half mark has been reached, this will imply the owning of a car on every farm of even moderate size, and by most of the salaried workers in the country. But private ownership and use, albeit largely for purposes commercial in their nature, is but the smaller part of the usefulness of the automobile. Some indication of the trend which the industry is now taking may be had from statistics of the 23 firms mentioned above as the latest comers in the field. Of these, 10 make pleasure cars, 11 make commercial cars, and two make both pleasure and commercial models. In the list previously published were enumerated 176 makers of pleasure cars, 22 who made both, and 24 who made commercial cars exclusively. The addition to the commercial ranks is nearly 50 per cent., that to the pleasure car makers less than 6 per cent. Thus is indicated the turning of the tide.

In all branches of commercial vehicle work the progress made so far has been only sufficient to give some view of the immense field ahead. From the lightest 500-pound delivery wagon to the 10-ton coal truck there is an immense range of possibilities. The comparatively few commercial vehicles in operation now have been sufficient to prove the economies of this method over the old-fashioned horse-drawn vehicles. During the four years which we have in prospect the greatest advances will be made in this line.

In several classes the automobile has already made notable

inroads into the province of the horse. Most of the large department stores in New York, Chicago, and other large cities have discarded their horse-drawn delivery wagons, and have adopted motor vehicles instead. In brewery trucking motor power is almost supreme, and in the conveyance in large quantities of groceries and miscellaneous merchandise it has become prominent. Most conspicuous of all is the taxicab, which in the space of three years has practically put horse cabs out of business in all the large cities.

Newspapers find the automobile invaluable as a means of conveying their editions to outlying distributing stations. When the crowds leave the Harvard Stadium after a football game, they are met at the gates by newsboys with Boston papers from presses five miles distant, giving practically complete the details of the game and the final score—thanks to automobile delivery service.

With the lone exception of the Fifth avenue and Riverside Drive busses in New York, this country has nothing to compare with the innumerable bus lines in London, Paris and other large European cities. Certainly they are needed, and they will come. The 'bus line has every advantage over the trolley for infrequent service, and proves a formidable competitor even under "rush" conditions. For suburban and country service the next few years will find them supreme.

Further developments may be forecasted with some degree of accuracy. Automobile delivery service is sure to become universal; now used only by companies who must maintain extensive establishments, and by a few smaller concerns for advertising purposes, it will gradually spread among all classes. Great numbers of light delivery wagons with two-cylinder motors of moderate power, especially adapted to this service, will be produced this year.

In the truckage field the prospects are equally bright. Manufacturing plants, large retailing and wholesale merchandise houses, and dealers in coal and building materials will find motor service quicker, surer and more economical than horse service. Those concerns will especially benefit whose business requires the transporting of heavy goods between factories or distributing points twenty or more miles distant. All sorts of express and mail delivery will be done by motor power.

An important development in this connection will doubtless be the appearance of companies which will rent automobile trucks and delivery wagons on a service basis. The renting companies will own their own machines, a hundred or more in number; will maintain their own garages, do their own repairing and hire their own drivers. The companies who buy the service will do so simply on a mileage or ton-mileage rate, or on a basis of the number of deliveries made, according to agreement; they will buy a definite service and incur no risk beyond.

As feeders for railroad and interurban electric lines automobiles are already of great utility. Many farmers are finding that they can combine in one car a pleasure vehicle for family use, a swift runabout for business purposes and a light wagon for carrying fruit, vegetables and milk to the railroad station. The enormous spread of the good roads movement is constantly broadening the possibilities in this field.

When all these spheres of activity are considered, the number of automobiles which it is possible for the people of the United States to buy and make use of seems to enlarge almost beyond limits. With every delivery wagon, truck, farm wagon, cab and omnibus replaced by an automobile, it is easy to see the possibility of absorbing the two million or more cars of the estimated production by 1913.

The benefits of the change will be far-reaching. The primary reason for the adoption of the automobile in all the cases cited is its economy over present methods, whether in money or what is just as important, time. With automobile service universal, the economy may even be extensive enough to make a reduction in the "cost of living," now such a prolific source of discussion. Although the automobile has been the cause of many jokes on the mortgaging of homes, and is regarded in some quarters as a sign of reckless extravagance and profligacy, innumerable business men will vouch for its usefulness. Truer than ever before is the saying that transportation is civilization.

**GEOGRAPHICAL DISTRIBUTION OF PLANTS**

| Plants | States | Plants | Cities |
|---|---|---|---|
| 42 | Michigan | 25 | Detroit, Mich. |
| 31 | Indiana | 11 | Chicago, Ill. |
| 29 | Ohio. | 10 | Cleveland, O. |
| 26 | New York. | 10 | Indianapolis, Ind. |
| 24 | Illinois | 8 | St. Louis, Mo. |
| 17 | Pennsylvania | 7 | Milwaukee, Wis. |
| 15 | Massachusetts. | 7 | Buffalo, N. Y |
| 14 | Wisconsin | 6 | Cincinnati, O. |
| 9 | Connecticut | 5 | New York City. |
| 8 | Missouri | 5 | Pontiac, Mich. |
| 5 | Minnesota | 4 | York, Pa. |
| 3 | New Jersey | 4 | Springfield, Mass. |
| 3 | Maryland | 3 | Philadelphia, Pa. |
| 2 | Iowa | 3 | Dayton, O. |
| 6 | Scattered | 3 | Reading, Pa. |
| | | 3 | Hartford, Conn. |
| 234 | Total | 3 | Auburn, Ind. |

In cities the use of automobile trucks and delivery wagons will solve the traffic problem. Although traffic as a whole is able to move faster than its slowest members, it is nevertheless considerably impeded by them. Moreover, the adoption of the automobile means the saving of the space formerly occupied by the horses, in many cases amounting to half the total length of the vehicle. With each individual vehicle only taking up half the space that it formerly did, and moving at twice the speed, it is plain that there will be four times as much room. Increased speed, even in cities, is by no means necessarily dangerous to the public. With proper traffic regulation, the greater speed means ample time for crossing in each direction at street intersections, at the same time without causing undue congestion.

The advantage to public health resulting from the disappearance of horses and their accompanying pests, the livery stables, will be inestimable. Street dust is a prolific breeding place for germs of every kind; its noxious effects are recognized by physicians. The passing of the horse means no more dust, and a consequent saving to municipal street-cleaning departments. These advantages will be recognized more and more with time, and in 1913, with the speculative two millions of automobiles in operation, it will not be a cause of surprise if all large cities will have passed laws prohibiting the keeping or use of horses within their limits, save perhaps for driving or riding in certain specified parks and boulevards.

One more consideration—these estimates have been made without considering the export possibilities, which are sure to be developed much more than at present. Although the field for automobiles in all Europe is perhaps not so large as in the United States alone, it is nevertheless of very considerable size, and the home factories are not only incapable of caring for it, but show no inclination to expand in order to do so. Quite possibly another million cars may be absorbed by the European market, at present developing rapidly.

**ESTIMATED PRODUCTION BY STATES**

| States | Cars | Value |
|---|---|---|
| Michigan | 160,000 | $205,000,000 |
| Ohio | 45,000 | 66,000,000 |
| Indiana | 38,000 | 55,000,000 |
| New York | 12,500 | 40,000,000 |
| Illinois | 11,000 | 17,000,000 |
| Wisconsin | 10,000 | 14,000,000 |
| Pennsylvania | 7,000 | 12,000,000 |
| Connecticut | 4,000 | 12,000,000 |
| Scattered | 15,500 | 29,000,000 |
| Total | 303,000 | $450,000,000 |

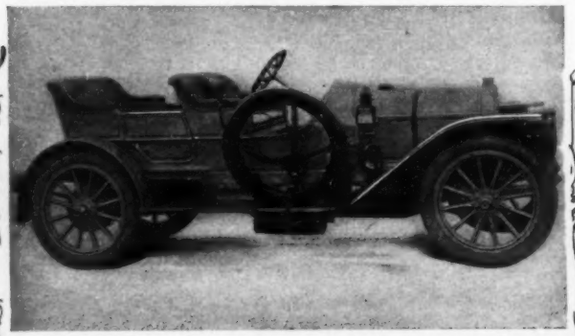
# Mechanical Details of New England's Product

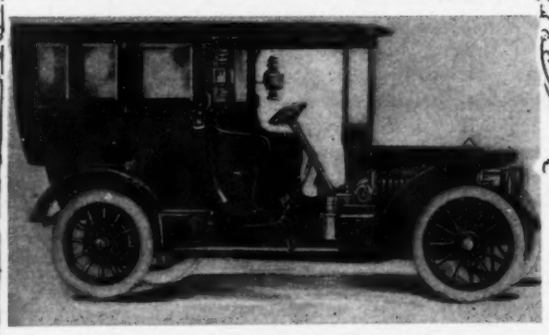
CONSERVATISM, which is said to dominate all of the actions of New England folks, need not of a necessity be applied to the automobile manufacturers located in that flourishing part of the country. These makers, though rather few in number, compare favorably with those from any other section in progress, both in larger matters and in the small niceties of detail.

The parts shown elsewhere on these pages show this and if further proof be needed some brief description will be added, this dealing more particularly with some one feature of each car, rather than attempting to describe the car as a whole. This scheme will have the advantage of accenting the more notable details of construction, to which every maker is pledged in one form or another, as well as supplying at the same time much real and practical information.

With perhaps a single notable exception, no one feature is more notable than that of uniformly high or medium prices, that is to say, there are few if any very low-priced cars made in New England. As to features, all of them are represented, including chain drive, two-cycle engine, air-cooled engines, steamers, wire wheels, electrics, commercials one, two three four and six cylinders unit power plants, valves in pockets and in the head, two, three and four speed transmissions, and many more minor features. In short, taking the cars as a whole, they run the whole gamut of motor car parts, both as to design, methods of construction and assembling and manufacturing methods.

This is, of course, to be expected, and probably, or at least, possibly, would be true of any other section of the country, which might be picked out, and its product analysed. Of all the features listed, steam has long been thought to have its home exclusively in New England, but latter day statistics show this idea to be fallacious, the increased output of Ohio, Michigan and Illinois factories devoted to this branch, coupled with the decreased activity of some Bay Staters in this line, having shifted the geographical center, so to speak, so much farther West that it passes out of the western boundaries of New England proper.

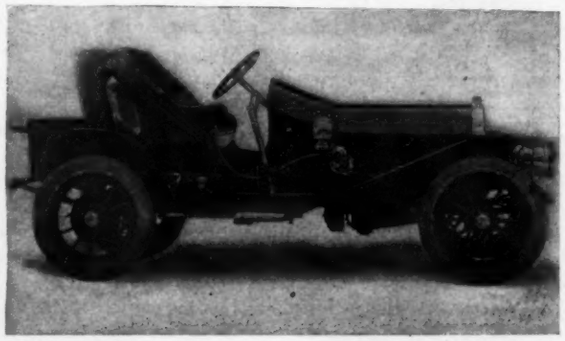




Top—Hartford, Conn., Is the Home City of the Columbia
Bottom—The Locomobile, of which Bridgeport, Conn., Is Proud

## Alco Adopts Shaft Drive Entirely

With the announcement of the season's models it was noted that the Alco has now definitely abandoned the chain drive for its own system of shaft drive, in which the load-supporting member of the rear axle is a solid drop-forging. This drive has been thoroughly tested in the Alco town cars and taxicabs, in which it has been always used, and its adoption in the larger models is in no way remarkable. Another important change is the adoption of the Bosch dual system of high-tension ignition, which includes a storage battery with the magneto, although both work on the same set of plugs. The use of the battery enables the motor to be started on the spark. These are the chief changes; they are in conformance with the policy of the company to Americanize the French design of the Alco in order to meet the prevailing demand. The company emphasizes the fact, however, that never is any change made until it is certain that the quality and all the distinctive character can be maintained.



Rakish Knox "Sportabout," a Product of the Springfield, Mass., Factory

Most of the excellent features have been retained, and each one of these is a reason for buying in itself. The special design of rear axle of the full floating type, the French type of engine, Americanized, the anti-fatigue steel used throughout the car regardless of cost, the unusually large and powerful brakes, the deep, square tube radiator and other features which space prevents the mention of, are all mute but eloquent arguments in favor of the Alco car. With these changes goes a considerable reduction of prices.

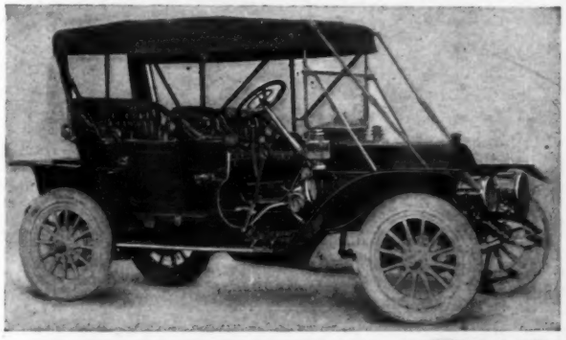
Turning to the table of standard American automobiles, as given in last week's THE AUTOMOBILE, it will be noted that the changes were such as to bring this car more close to the standard, the percentage of chain-driven models in their class, the $4,000 class, being but 8.1. So, too, with the change in ignition, although this percentage is but 10.4 it marks a tendency which is growing rapidly.

## Cameron Line All Air Cooled.

Air as a means of cooling the cylinders of the engine seems to appeal to the makers of the Cameron cars, the Cameron Car Company, located at Beverly, Mass., and New London, Conn., since all models turned out are thus cooled. For this year both four-cylinder and six-cylinder models will be listed, with all styles of body, a distinctive engine, as well as transmission, while the prime idea of the whole construction is that of obtaining light weight without making any sacrifice in other ways.

Not only will two separate and distinct types, such as a four and a six, be built, but they will be manufactured in two separate and distinct factories, each devoted to a single style and type of car. This should result in each one being superior to what it would be if the two were made under the same roof. The fours are manufactured at the Beverly plant and comprise five models, including two-passenger runabout, special two-passenger featherweight flyer, three-passenger roadster, four-passenger surrey with detachable rear seat, and standard touring car. The prices range from $950 to $1,100. The sixes are manufactured in the new plant of the Cameron Company located at New London, Conn., and the line comprises five models as above, all listing at $1,500.

It has been the policy of the Cameron Car Company from the very earliest days of its existence in 1902 to manufacture its cars complete in its own works, and this policy is being pursued in exactly the same manner to-day. The four and six-cylinder cars are manufactured in separate plants which build. from the ground up, all parts which go into their respective cars. Every detail is known to a certainty.



Knox Close-Coupled, Fully Equipped, Made in Springfield, Mass.

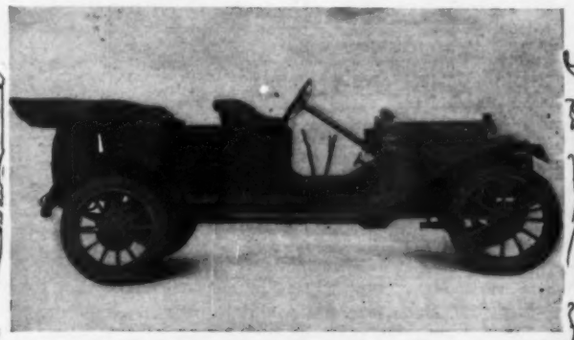
The motors for the coming season show no radical changes and are built along the lines on which Cameron has been working for the last seven years. Minor improvements will be found. but reference to the illustrations herewith will show that important features such as the system of air-cooling and location of valves remain the same as heretofore. The four-cylinder motor is 3 7-8 bore by 3 1-2 stroke, developing 24 horsepower, and the "Six" developing 36 horsepower. Both are regularly equipped with high-tension dual system of ignition, which inclues the magneto and auxiliary set of dry cells, gear pump, constant level oiling system of a very simple, effective design, oil being carried from a large chamber on the lower side of the engine base through a tell-tale on the dash and forced into the crankcase under a high pressure, where it is sprayed on shaft and connecting rod bearings. Thence it flows to the bottom of the case and lubrication is furnished to the cylinders by splash. The engine base is of aluminum, split horizontally in the center, the cylinders cast singly with radial fins.

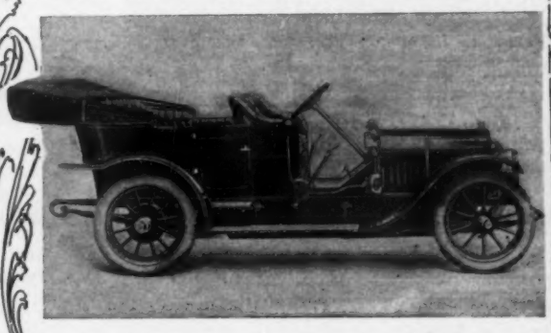
Clutch is a self-contained cone of proportionately large diameter and easy angle of contact. Engine bearings are of nickel babbitt; camshaft bearings, case-hardened steel set in cast-iron bushing, and crankshaft rocker arms and all important small parts are of drop forged nickel steel. The wrist pin construction of these motors is the same as has been used by Cameron for years and is slightly different from that known to general practice, the wrist pins being steel drawn tubes, hardened and ground, with a hardened and ground connecting rod swinging directly upon them with no bushings whatever, thus giving two round surfaces as a bearing. These will run almost indefinitely without showing any signs of wear whatever. It is claimed that this construction will outlast half a dozen bronze bushings.

The valve action is unusual. The valves are set in the cylinder heads opposite each other, with their stems horizontal. They are actuated by long rockers, one end of which bears on the cam and the other on the valve stem; no push rods are used.

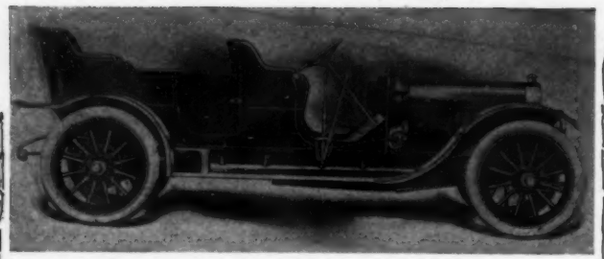
### SPECIAL REAR AXLE TRANSMISSION SYSTEM

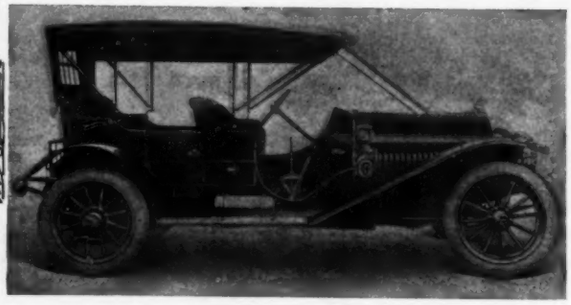
This is of the Cameron patented type, three speed selective, direct drive on all speeds. The six-cylinder system is slightly different from that used on the four-cylinder cars. This change will readily be understood by those who are familiar with the transmission. On the lighter machines, that is, the four-cylinder line, the transmission carries three gears on the cross or jack-shaft and one on the differential, while on the heavier transmission used in the six-cylinder cars, two gears are carried on the cross-shaft and two on the differential. While all of the six-cylinder models weigh less than 1,700 pounds, still this car is slightly heavier than previous models, and with the great power of the motor, of course, requires a heavier gear all round than the four-cylinder cars. The power is delivered from the engine to the rear wheels through a single universal joint to driving shaft and bevel gears, to the cross or jack-shaft, and finally, from the cross-shaft by wide face spur gears to the rear

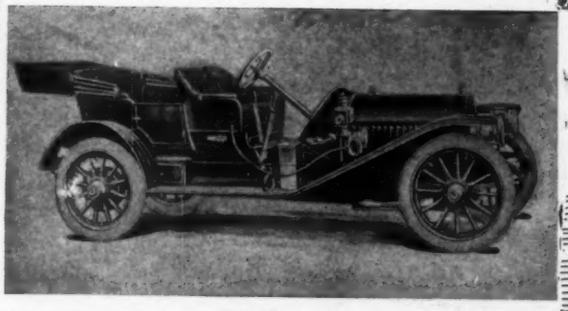




Top—The "Full Jeweled" Corbin from New Britain, Conn.
Bottom—Hartford, Conn., Is the Home of the Pope-Hartford







Top—Another from Springfield—the Two-Cycle Atlas
Middle—Alco, from Providence, R. I., as a Tourer
Bottom—Representative of the Locomobile Factory

axle. The advantage gained in this construction aside from the fact that the gears, instead of being thrown into mesh sideways, are thrown directly together face on and rolled together with a natural motion, is the fact that the bevel gears never receive more than the engine pull, and being set up firmly in mesh in a solid steel frame running on adjustable ball bearings, have no chance of springing out of mesh under heavy load or showing any undue wear, which always means much loss of power to a bevel gear.

In shifting gears, the arch carrying the gear set is first thrown forward in the case when the combination of gears wanted is thrown into line. When traveling crosswise in the case there is no strain against the gears to prevent sliding over. Gears are then brought together, face on, with a natural rolling motion which prevents jar, shock, or any injury to the gears themselves, as no strain of the engine pull can be put upon the driving gear until they are firmly in mesh and locked into position. The reverse gear stands idle except when in use, and is then thrown down in mesh from the top of the case. All gears are of unusually wide face and coarse pitch, are made up of drop forged blanks of chrome nickel steel, as are also the shafts. Ball bearings are used throughout the transmission and rear axle and are of annular type, of Cameron's own design and construction.

## Refinement of Fine Car, Columbia

Close attention to the main details of the product will be the keynote of the Columbia production for 1910, the result being an ultra-refined Model 29. With the model first evolved in 1906 there has been opportunity to raise each unit of construction to a very high place and for the year at hand the new car will first interest veteran motorists for a number of little niceties which have been incorporated. Friends have said that it contains more clever features than any car of current building. Also, it is fair to state that no new car in its first or second year could have been worked out to a state of such high efficiency.

The company is building the car as well as Columbias have been built in the past, which means to a fine point of machining accuracy. Further it is provided with a higher quality of raw material than the market has ever previously held. These and what seems to be a fortunate selection of body styles have made for a strong interest in the car.

As to body style, the latest form which this takes is the short chassis with toy tonneau, double or single rumble. All three of these are interchangeable. This particular body is frequently done in a light gray, striped a lighter green, and upholstered in dark green. The whole effect is very attractive, as are also all of the other color tones, most of which show a tendency towards gray and the other, pleasing lighter colors.

### BRIEF MENTION OF DETAILED CHANGES

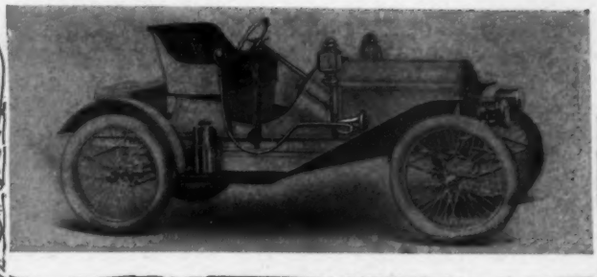
Considering the mechanical parts in detail of the model known as Mark 48, Lot 4, the bore and stroke, together with the dependent working parts of the engine have been increased in size. The valve springs are completely covered to exclude dirt and eliminate noise. The crank case is extended to enclose the front engine gears, so that the splash oiling system now lubricates these gears. The oil supply is carried in a compartment cast integral with the lower half of the crank case, a float indicator showing the amount on hand. The oil pump, driven by bevel gears from rear end of valve cam shaft, is located below the level of the supply, thus relieving it from drawing up the oil. The oil level in each compartment of the crank case is regulated by thumb screws, easily accessible from the outside. The governor is driven by bevel gear from rear end of cam shaft. A drain cock has been installed on the water pump. The float feed, multiple-jet carburetor has a hot water jacket surrounding each mixing chamber and an automatic air valve is added to the small barrel, resulting in a more uniform mixture. A square section intake pipe replaces the round pipe of preceding practice. The "Seeley" jump spark ignition system with separate set of plugs, introduced over the inlet valves is installed in addition to the regular make-and-break system, and takes current either from an "Exide" Storage Battery or "Bosch" low tension magneto, enabling one to start from the seat. The distributor for the jump spark system is driven by bevel gear from rear end of cam shaft. The engine starting ratchet is attached to the engine middle section instead of the frame, resulting in perfect alignment. The radiator of "Extended section type," is of increased size and provided with a rubber covered cap. It is swung on trunnion supports and therefore receives no strain from any frame movements or distortion.

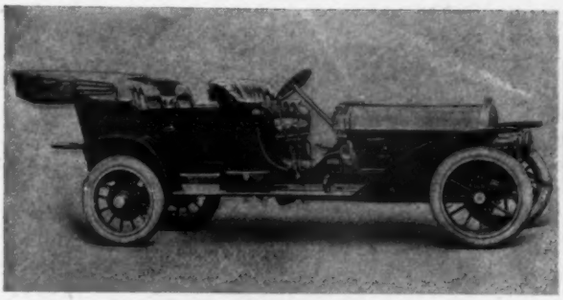
The fly-wheel rim markings are numbered in sequence to facilitate valve and ignition timing. The cone clutch is increased in diameter and the clutch shoe springs are made adjustable and self-locking. The universal joints on the propeller shaft are completely enclosed in grease retaining covers. The rear axle housing and all moving parts therein are increased in size in proportion to the increase of engine power. The braking surfaces on rear hub drums are greater and the contracting foot brake bands lined with "Thermoid." Clutch and brake foot pedals are of disappearing type, adjustable to any length of

limb. All brake rods are adjusted by locking bar turnbuckles, eliminating the use of wrench or other tool. The foot pedal operating the large carbureter is set level with the floor to insure foot support and steady, easily applied pressure.

### ELECTRICS, TOO, HAVE BEEN REFINED

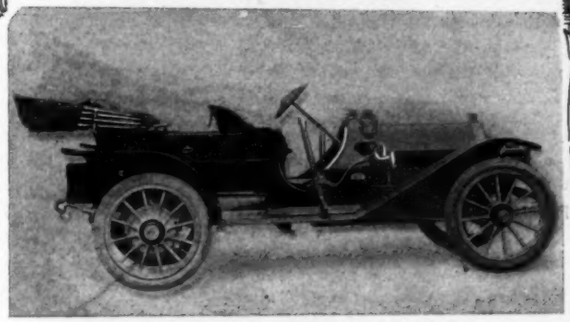
In this day and age of the gasoline machine, it is interesting to note a maker giving almost equal attention to the electric. This is the exact situation of the Columbia concern, the electric vehicles having been made the recipient of as much study as the gasoline driven cars. The electrics are now made in two distinct models—a light Victoria-Phæton and a town carriage of the coach class, the first being well suited to the use of physicians and women and valuable for all purposes demanding a light, speedy conveyance for two persons. The leading features include divided Exide Hycap battery of 24 cells with its weight evenly distributed over both axles. improved type of motor, six speed continuous torque con-





troller, two complete sets of brakes, each independent of the other, "Hess-Bright" ball bearings throughout, and thirty inch wheels fitted with Hartford quick detachable rims and tires.

The Columbia town carriage is provided with either a brougham or landaulet body, and for private service is unexcelled. In the construction, lightness has been obtained everywhere but nowhere at the expense of strength. Hartford pneumatic tires in combination with a most flexible form of spring suspension insure easy riding qualities never before attained in a vehicle of the coach type, either self-propelled or horse-drawn. Speeds ranging from 4 to 18 miles per hour are quickly and easily obtainable through a controller lever mounted upon the steering column within convenient reach of the driver. Two powerful, independently operated brakes, and a safety switch insure absolute certainty of control under all conditions of street traffic. The special Exide battery is the most efficient and reliable yet devised for vehicle use. There are inside seats for five persons. The upholstering, interior fittings and appointments are of the finest materials obtainable and the entire finish down to the smallest detail is of the most elegant.



Top—Metz, from Waltham, Mass., Sold Unassembled.
Middle—Stevens-Duryea, from Chicopee Falls, Mass.
Bottom—Four-cylinder Stevens-Duryea Baby Tonneau

## Finances Favorable for Corbin

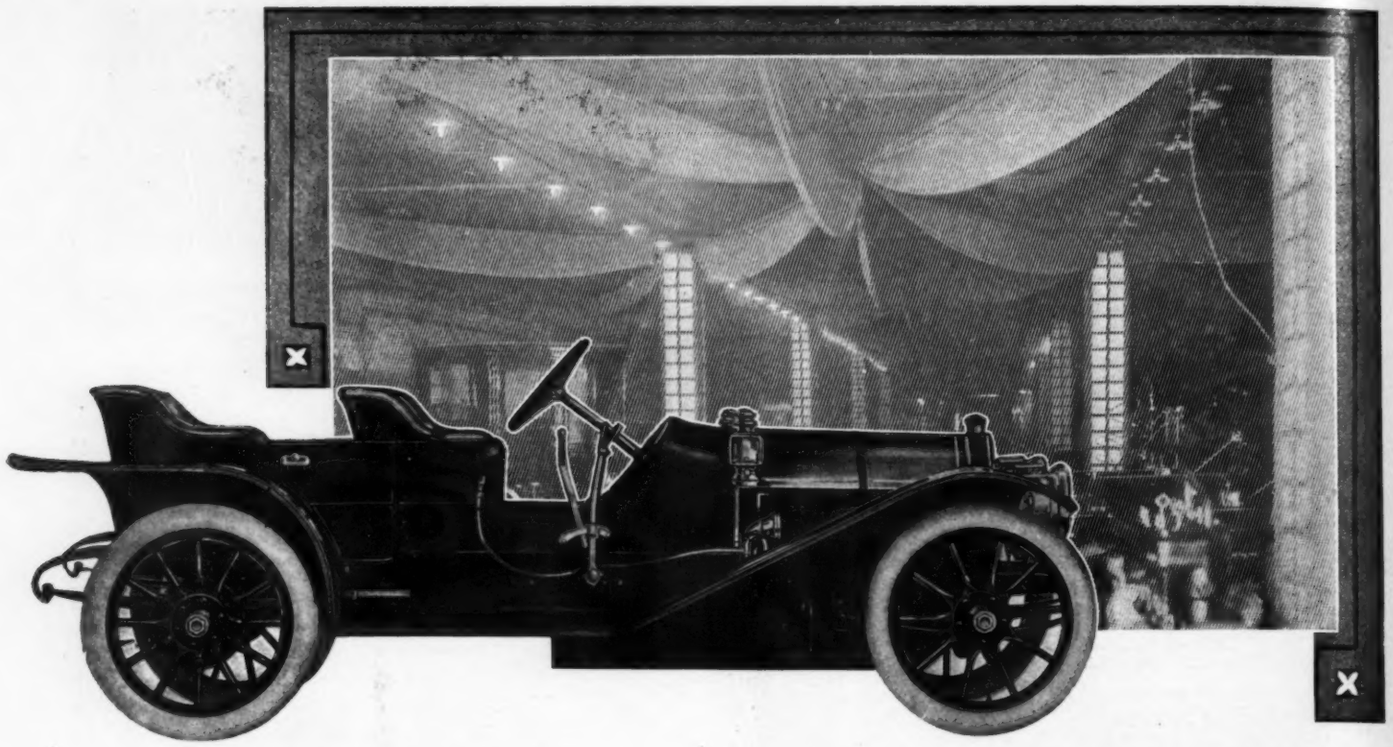
Standing and backing of a firm have a great deal to do with the ultimate best results to be obtained from a car, and considering this, the Corbin Motor Vehicle Corporation, New Britain, Ct., considers itself eligible for a large share of the possible business to be done in 1910. This concern is associated with other large manufacturing establishments, the cars have been the results of splendid engineering skill and knowledge, and it is the announced intention of the factory that the same standards shall be maintained throughout the immediate as well as future seasons.

As in the past the efforts of the entire force will be concentrated upon a single model, giving the experiences gained in five years of making Corbins, and some of the constructive details proven in the models in which they were pioneers are important still. With one type of chassis will come two motors, either water or air-cooled, though the latter will be made only on special order, and the two engines are interchangeable, of course, with their individual fittings. The success of the 1909 season was so marked that the prospects become bright for an even more flourishing one ahead and orders for material sufficient for 600 automobiles have either been let or are pending. It is planned by the officials to turn out that number of cars during the 1910 period and already deliveries have been going on for a month.

### WHAT HAS BEEN DONE IN REFINEMENT

As has become somewhat general among the stable members of the industry, standardization has been attained to such a degree that few deviations are necessary. In the new Corbins this will be well illustrated, for the variations from previous practice may be counted upon the fingers of one hand. In the motor itself the principal ones include enclosed timing gears, a new type of oil pump and a changed location, and the moving of the magneto from the front inlet side to the rear exhaust side. The oil pump was formerly mounted midway on the exhaust side and driven directly from the camshaft, but now it is further back on the same side and is driven by the same helical gear which operates the distributor. The pump is now a centrifugal one instead of plain-gear and forces oil from the reservoir, under the foot-boards, through dash sight feeds to the four cylinders and thence to the crankcase for splash. The two-to-one or timing gears remain at the forward end of the case and are enclosed in an aluminum oil-tight case. A Bosch magneto is now regular equipment and this is placed at the rear of the exhaust side and driven by aluminum to fiber gears from the camshaft. In previous models this has been extra equipment and provision was made to drive it from the timing gears at the front next to the carbureter. The change keeps all moving parts on one side.

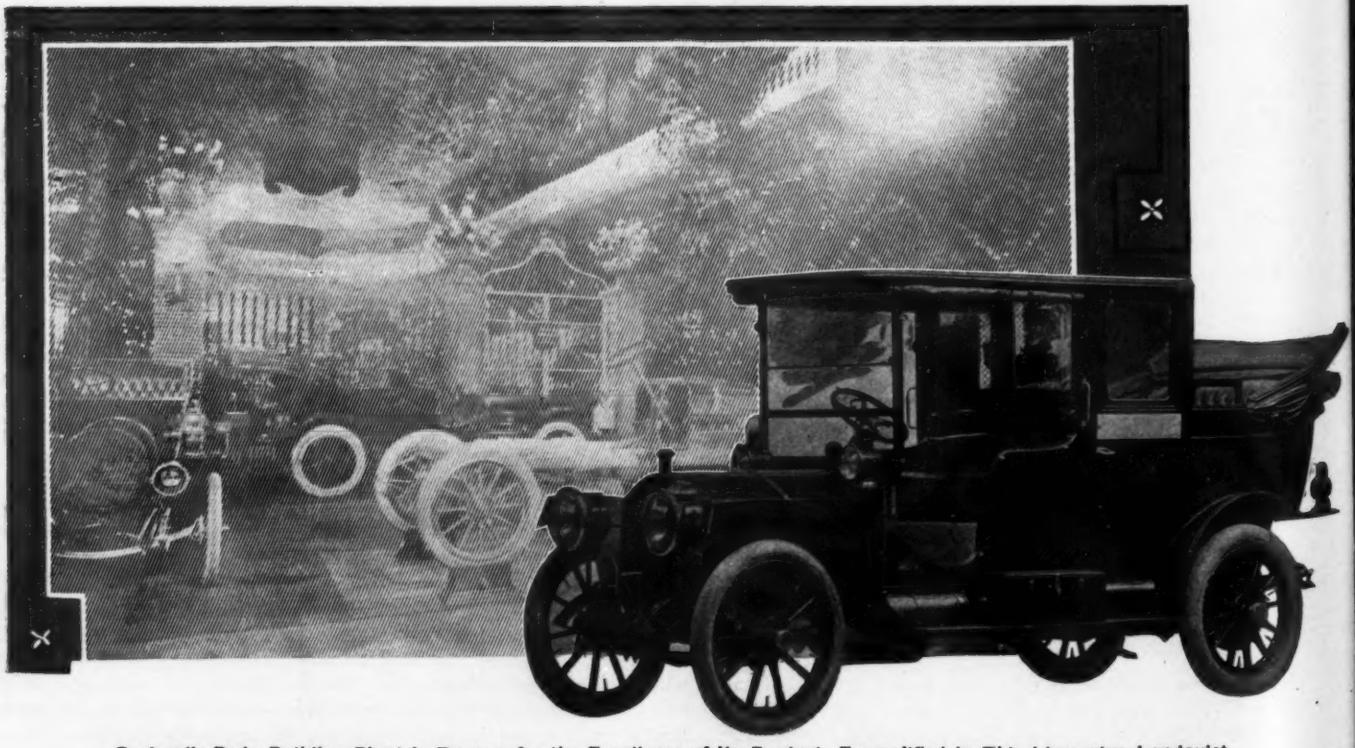
In the chassis the frame has been lengthened 2½ inches and this put into the wheelbase to insure greater comfort.



Of the New Roadsters and Baby Tonneaus, None Has More Dashing Lines than the Chalmers "Forty" in This Model

## Houpt Makes Large-Sized Engine

Bristol, Conn., is the home of the Houpt car, a comparative newcomer in the automobile line, but made by a man old in years of experience, Harry Houpt, formerly Metropolitan agent for the Thomas cars. The first car was a four-cylinder sixty horsepower model, but a later model is to be produced of six cylinders, which will be rated at 90 horsepower. The four-cylinder Houpt car is thought to be the largest four-cylinder stock car made in this country; its cylinders are 5½ inches bore by 6 inches stroke, rated at 60 horsepower. The cylinders are cast in pairs, and the valves, 2⅝ inches in diameter, are placed on opposite sides. In general the motor follows standard design. In the tests at Bristol, the motor showed exceptional power and quick acceleration, combined with practically noiseless operation. The carbureter is float-feed, the gasoline being under pressure in a tank slung from the rear of the frame. The water-cooling system employs a centrifugal pump with both



Packard's Body-Building Plant is Famous for the Excellence of its Product, Exemplified in This Limousine-Landaulet

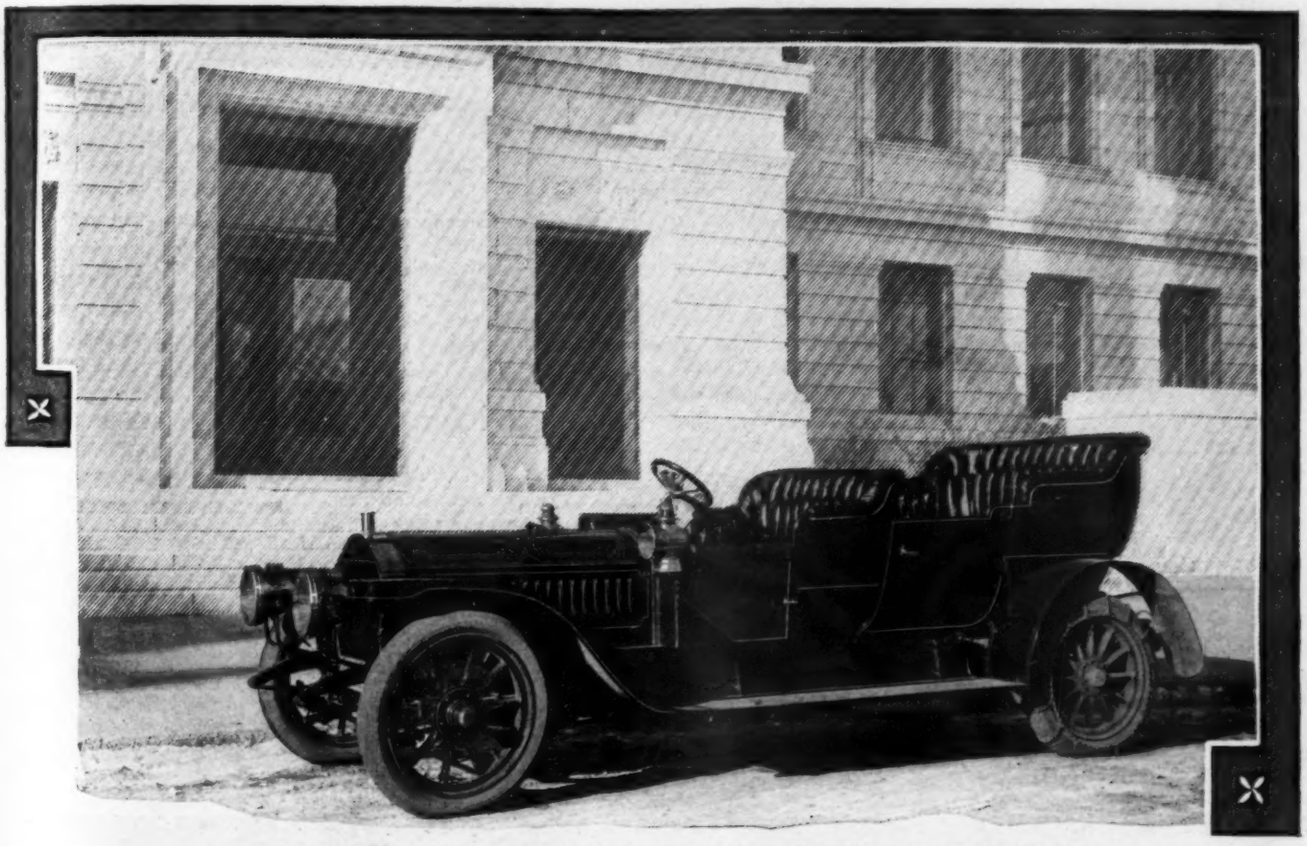
radiator and flywheel fans. The ignition is double, with a single set of spark plugs in the cylinder heads.

Power is transmitted through a multiple-disc clutch containing 53 steel-on-steel discs, and the change-gear is of the selective type, giving four speeds and reverse. Drive is by a nickel-steel cardan shaft to a full floating type of live rear axle, with bevel differential. The frame, also of nickel steel, is dropped forward of the rear axle and rests on semi-elliptic springs both front and rear. The motor suspension is four-point and that of the gear case three-point. Brakes are internal expanding on the rear hubs and external contracting behind the gear case. The wheelbase of the four-cylinder car is 127 inches; wheels are 36 inches, with 4-inch tires in front and 5-inch in rear. The car weighs 3,100 pounds. The six-cylinder model has cylinders the same size as those of the four, and its power will be conservatively expressed by the maker's rating of 90 horsepower.

### ENGINES WATER-COOLED, FOURS AND SIXES

All Knox motors are now water-cooled, with valves located in the head, a location which has become very popular on the other side, being a noticeable feature of every winning car of this season. Model "R" cylinders are 5-inch bore, 4¾-inch stroke, rated at 38 horsepower, A. L. A. M. standard; Model "M" is 5½-inch bore and 5½-inch stroke, rated at 48 horsepower, A. L. A. M. Both have cylinders cast separately; each consists of two distinctive castings—the cylinder proper and the head. The water jacket of the cylinder is cast integral therewith, the water entrance being at the lowest point, and the outlet near the top on the right-hand side of the casting.

In the upper end of the cylinder casting a deep concentric groove is machined in which fits a copper asbestos gasket. Upon this is seated a corresponding concentric tongue formed on the bottom of the head which is firmly secured to the head by four



Boston Is Headquarters of British Napier Car, Which Is Imported from the London Factory

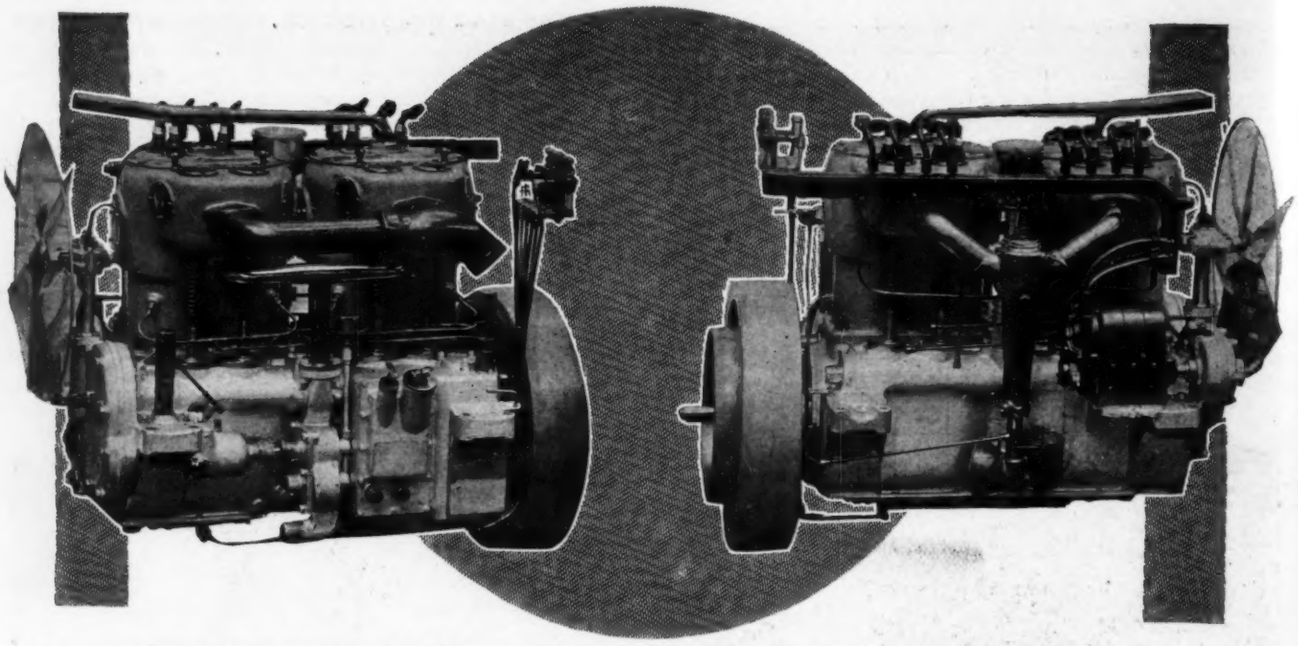
## Unit Power Plant a Knox Feature

Among the many excellent cars hailing from the Bay State, no one is more prominent than that hardy pioneer, Knox. This car is made by the Knox Automobile Company, Springfield, Mass., and contains many features of mechanical excellence, which have been used so long as to be synonomous with the name. Thus, might be mentioned: Unit power plant, three-point suspension, multiple disc clutch, double ignition, De Dion system of lubrication, and many more. For 1910 this concern will turn out three models, Model M, continued from 1909 and previous years on account of its continued successful career; and the different cars just added to the list, Model R, of 40 horsepower, which replaces Model O of last season, four cylinders, and a new "six," Model S, rated at 57 horsepower. All of the newcomers follow in a general way the construction of Model O, since the success of that model is taken as the best kind of proof that the form of construction is wholly right. The similarity of the different motors is remarkable.

bolts. It is impossible to bring these parts together except in a correct location and with a correct bearing. This joint, it should be noted, is not a water joint; in fact, there are no water joints in this construction which can occasion a leak into the cylinders.

By this simple construction cylinders are secured symmetrical in form and perfectly uniform in cross section, which fact reduces to a minimum the liability of going out of round. Furthermore, they may be easily and accurately machined, the casting being entirely open at both top and bottom. The bottom of the head is also machined so that the entire surface of the combustion space is smooth and accurate in capacity, giving a perfect balance of the volumes of all cylinders, which contributes to sweet and even running. Machining the combustion space has other advantages, usually not taken up because of the cost.

In addition to this, the smooth surface of the combustion space is less likely to retain deposits of carbon than the rough casting, and the entire absence of sharp points, edges and roughness is supposed to be a preventive of premature ignition. The



Peerless Motor Shows Neat Detail in Exhaust Manifold Jointed for Expansion and in Solid Rubber Bus-Bar

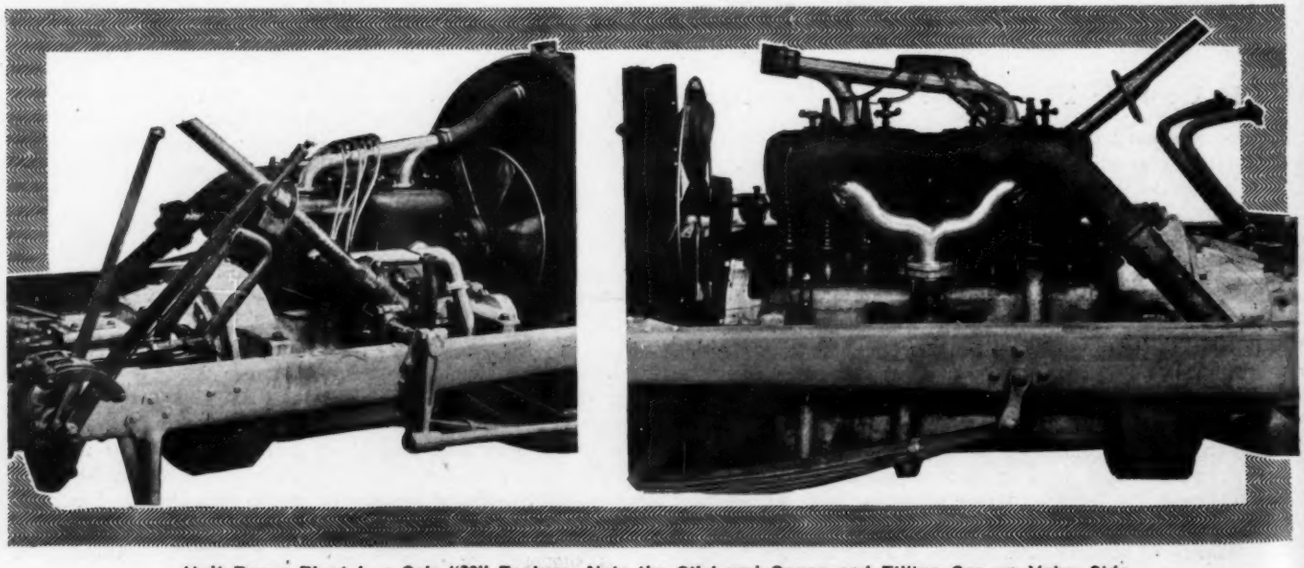
head is cast integral with its own independent water jacket, and the inlet and exhaust passages from the manifolds to the valves are cored in the head. The water spaces are large, the water circulating freely around all the parts mentioned as well as around both valve seats, the head being cast with a division through it horizontally, making two separate water spaces, the water circulation being directly over the valve seats, returning through the top water space to the return manifold, the water entering the lower one through a single U-shaped hollow casting. The "U" connection and the return water manifold are held in place by a double clamp and single bolt easy to connect and disconnect.

## Concentration at Hartford

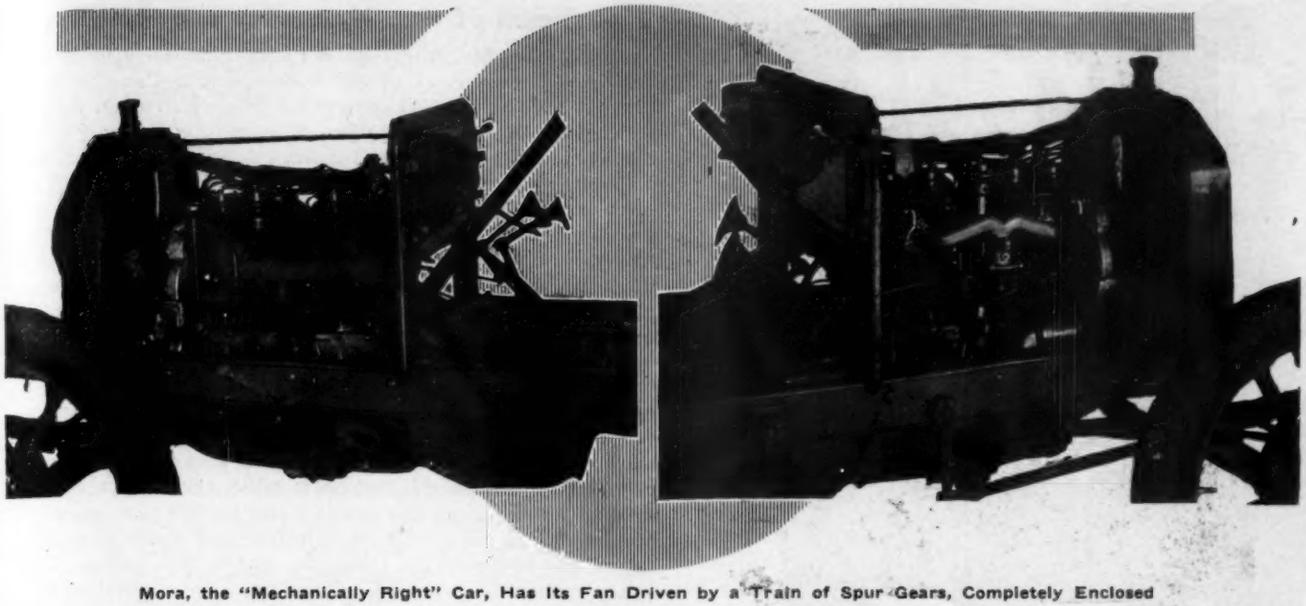
At the factory of the Pope Manufacturing Company, Hartford, Conn., although the body shops are located at Westfield, Mass., it has been decided to concentrate the whole attention upon one model and perfect that. For the year 1910, no attempt will be made at a large production, the modest figure of 1,000 cars being set.

This will bear the name of Model T, is a four-cylinder, 40 horsepower car, and may be had, at the purchaser's option, in six different and up-to-date body types. These are: roadster, seating two, three or four as no rumble, single or double rumble is used; pony tonneau, seating four or five; close-coupled body, seating five; seven-passenger, the name of which indicates its seating capacity; and two enclosed bodies, a limousine and a landaulet.

The changes which have been made since the details of last season's model were announced are few and far between. In the main, they constitute refinements, not changes. Thus, the longer wheelbase allows of a longer, more roomy and, consequently, more comfortable body. The greater length of body calls for slightly different lines, to conform with which the fenders and radiators were altered. The modern tendency to larger wheels is followed, and this year all sizes are 36 inches. The changes which include some actual difference in the design are: the lubricating system; new torque and radius rods; changes in the crankshaft and bearings; new clutch and clutch coupling. All have details which offer many points of interest to the student of automobile design.



Unit Power Plant Is a Cole "30" Feature; Note the Oil Level Gauge and Filling Cap on Valve Side



Mora, the "Mechanically Right" Car, Has Its Fan Driven by a Train of Spur Gears, Completely Enclosed

Doubtless the motor is worthy of the most attention, and this attention will not be wasted, for it possesses many meritorious points. Of the four-cylinder type, with cylinders cast in pairs, heads and water jackets are made integral. The cylinder castings are machined close to size and then ground to an accurate interior surface. Valves are located in the head, in cages which are readily removable and interchangeable. All valves are mechanically operated from the single camshaft on the left side by means of vertical pushrods and overhead levers. The valves are of large diameter, work on a 30-degree taper seat, and are ground to size. The valve springs are enclosed in a neat housing, thus keeping out dust and grit and preventing wear.

## MUCH ATTENTION GIVEN TO LUBRICATION

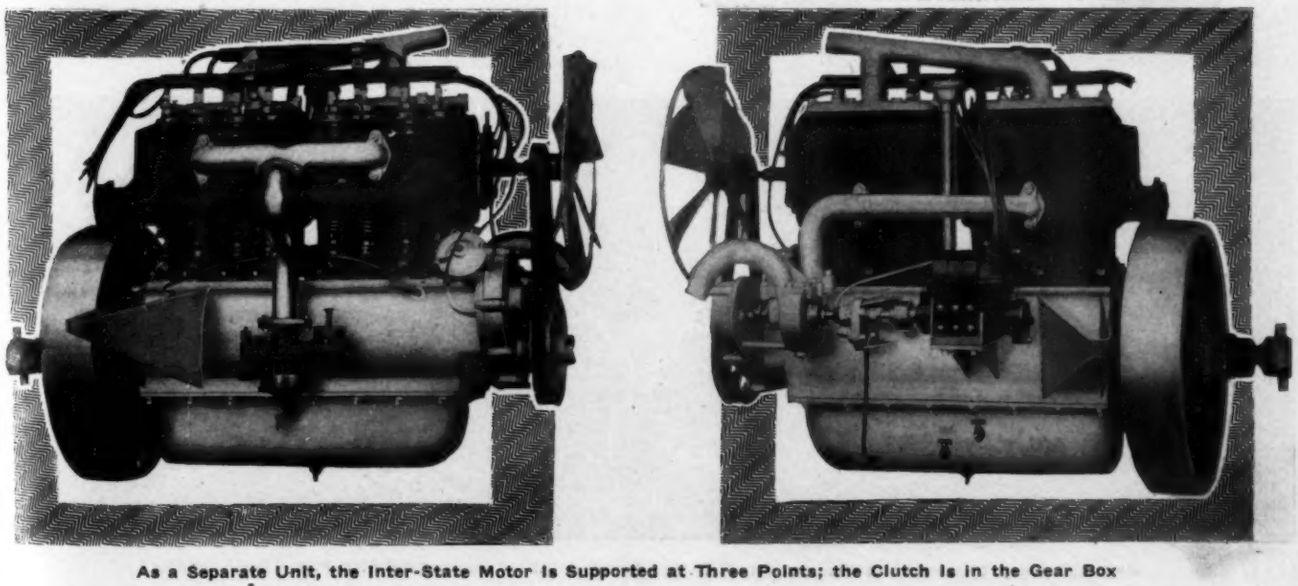
Over previous years, the lubrication is much improved; the mechanical oiler has been increased in size, moved slightly forward, an overflow from the oiler back to the oil pocket placed in the bottom of the crankcase, and a suction pump located in the case, which keeps the oiler body full. The oil pocket is cast on the bottom of the case, and is an integral part of it, although separated by a wall. The complete system is such as to lubricate the whole engine very efficiently. Besides the engine, the oiling of other parts is a subject of consideration.

## SEVERAL MODELS OF POPE COMMERCIALS

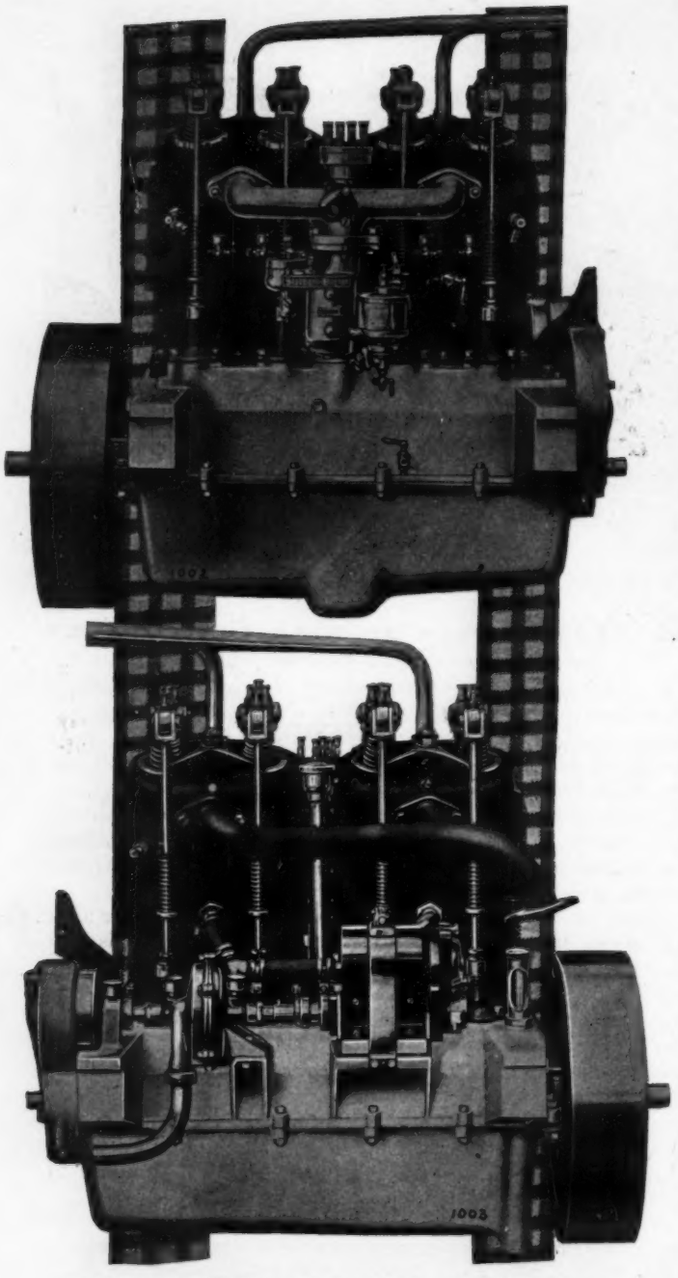
This firm also turns out on a somewhat similar chassis a fine line of commercial cars. Chief among those of this class which have been successful may be mentioned the ambulance, an excellent example of which was recently shipped to as far away a port as Rio de Janeiro. A description of this one will suffice to describe any and all of the ambulances made.

The body was mounted upon the regular chassis for commercial use, this being equipped with a 40 horsepower engine, three speed transmission, 130-inch wheelbase, standard tread, 34-inch wheels, 5-inch tires, and a special sixteen-gallon fuel tank.

Upon this chassis is mounted the body which was built after the special plans by the Navy Department of Brazil. It is very striking in appearance, for instead of the dark colors generally used on ambulances, it is painted with a soft French gray. This makes it more appropriate for use in a warm climate. One of the features particularly distinctive of this ambulance is the top. Here an entirely new idea has been put into effect. Instead of the closed roof, devoid of any means of ventilation, usually employed, this ambulance has what is called the "trolley" top. In this the top is carried up a little way above the sides, giving room for four oblong windows on each side and two both in front and in back.



As a Separate Unit, the Inter-State Motor Is Supported at Three Points; the Clutch Is in the Gear Box



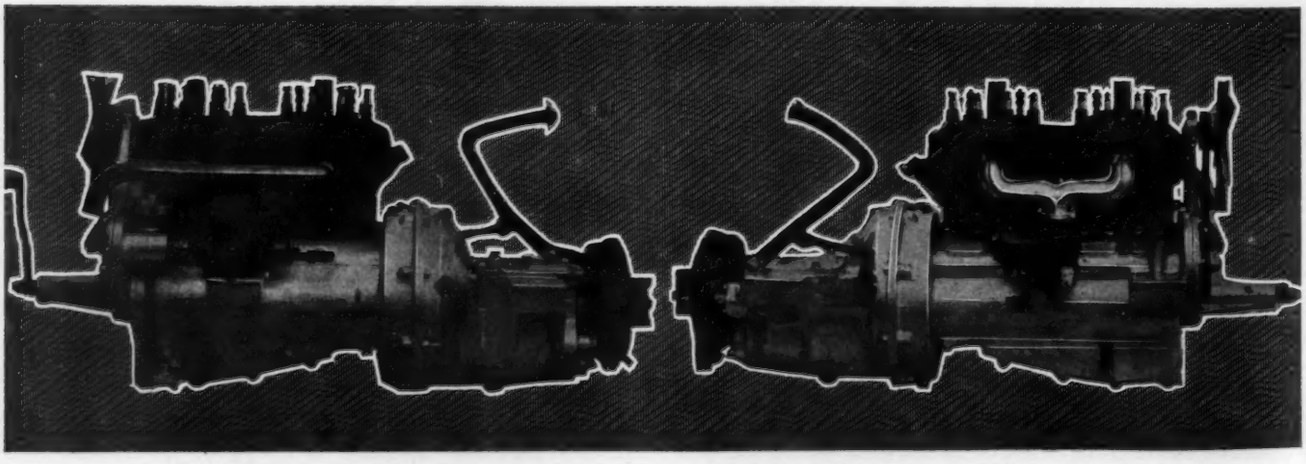
Stoddard-Dayton Motor Follows Lines Already Familiar

## Features of the Noiseless Berkshire

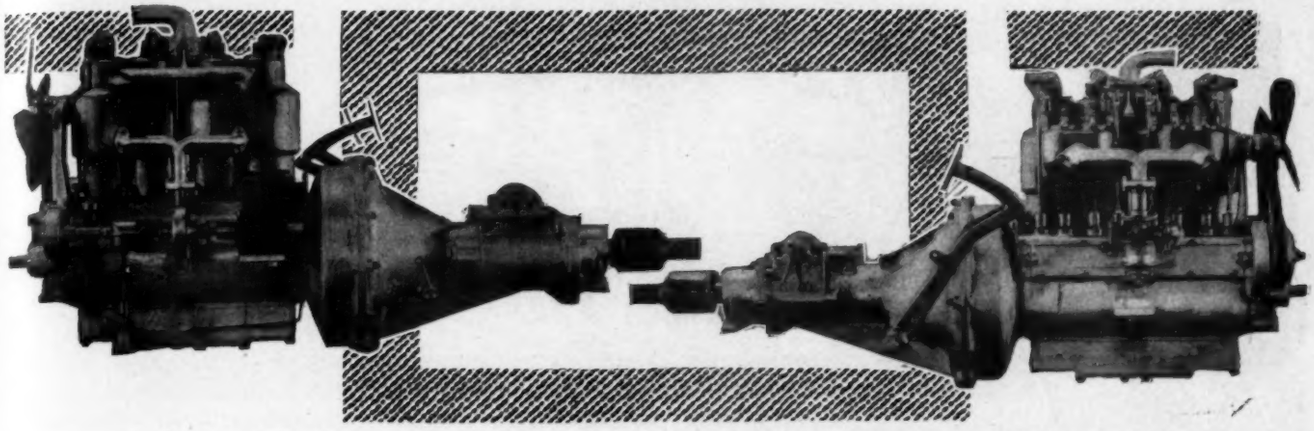
Built in the Berkshire Hills not only gives an idea of the location of the factory of the Berkshire Auto-Car Company, Pittsfield, Mass., but also conveys the idea of strength, rugged and hill climbing ability. The Berkshire motor is a four-cylinder vertical water-cooled type, and is rated at 35-40 horsepower, the rating by the A. L. A. M. formula being the former figure. The cylinders are cast singly with water jackets integral of a special gray iron which combines endurance and strength, and which by virtue of its composition resists wear better than the ordinary grades employed for this purpose. The water jacket spaces are of ample proportions and all parts are well surrounded by water. The cylinders are of the T-form, the inlet valves being at the right side of the motor, the exhaust members at the other. Special stress is laid upon the method of finishing the cylinders, foreign practice being followed. The cylinder after rough boring, and when the valve seats have been finished, is allowed to age for several weeks, and following the final boring, in which an exceedingly fine cut is taken, the interior of the cylinder is finished to exact size by a lead lap and paste made of oil and fine abrasive. The bore is four and eleven-sixteenths inches, the stroke of the piston five and a half inches. The valves are the flat seat type, a form which gives about 25 per cent. more area than the bevel seat of equal lift and diameter, and which has been demonstrated to be more enduring and to make for quieter operation. These members are nickel steel, are two and one-quarter inches in diameter and are interchangeable. The valve guides are not cast integral with the cylinder, but are screwed into place, making it possible to replace them at slight expense when worn, and insuring the same perfect mixture given when the engine was first built, by eliminating air leaks at this point which are unavoidable after the engine has been in service for a period.

### LONG PISTONS WITH FOUR RINGS

The pistons are long, and are of special hard gray iron, and are fitted with four concentric rings all above the wristpin. Five oil grooves below the wristpin make for proper distribution of lubricant to all points on the cylinder wall. The dome head piston design is followed, it being maintained that this prevents carbon deposits by allowing the oil to drain away from the top towards the walls instead of accumulating at one point, as is the case with the flat top piston. Pistons are rough turned, aged and lapped to size in much the same manner as are the cylinders. The wristpin is one and one-sixteenth inches in diameter, of special alloy steel, hardened and ground to size. The connecting rods are of the marine type, and are H-section drop forgings of nickel steel, having a special bearing construction at the big end. The wristpin bearing is a phosphor bronze bushing, while the lower end has separate phosphor bronze caps, bushed with Parsons' white brass.



High Efficiency Characterizes the Herreshoff Power Plant, a Unit Construction with Many Good Details



Location of the Exhaust Valves in the Cylinder Heads, as on the New Lion, Allows Exceptionally Large Area

## Many Taxicabs from Bristol Works

A limited number of Rockwell public service cabs, manufactured by the New Departure Manufacturing Company, of Bristol, Connecticut, are now on the market. This company has been manufacturing this cab for some time past, but its entire output has been taken by one concern. The contract has been completed and cabs are now available for purchase.

The Rockwell taxicab is distinctive in design and construction and offers a combination of advantages that appeal to both the operator and the patron. In the development of this cab, the company's designers went abroad and studied all the best makes of foreign taxicabs. Two hundred of these cabs have been in use in New York City for more than a year. A record of this practical service has proven the extremely low up-keep cost, strength and durability of construction, and economy of operation. During the severe storms of the past winter in the metropolis when the traffic was exceedingly heavy, the cabs were in constant service, and proved their reliability.

The motor is four-cylinder cast en bloc, with a bore of 3⅝ inch, stroke of 4⅛ inch, Bosch high tension magneto ignition with fixed spark. The force pump spray system of oiling is used with gauge on the dash. The clutch is three plate, floating ring of special design and mounted entirely on ball bearings. The radiator is one of the strongest types and is protected on the front by a heavy grid. The frame is pressed steel, extra wide with exceedingly strong front axle, spindle and wheels. The front and rear axles and transmission are mounted on New Departure double row ball bearings.

An important advantage is the easy accessibility of all parts and the quickness with which repairs or interchanges can be made. The engine and clutch can be removed by loosening four bolts and pipe connections and another set installed in less than half an hour. The coupling to the transmission is made by an Oldham slip coupling requiring no bolts. The control levers are integral with the gear case. The gear case and levers can be removed by lifting the foot board and loosening four bolts. Another set can be installed and all adjustments made in less than one-half hour. All upholstering can be easily removed for cleaning or repairing and is interchangeable.

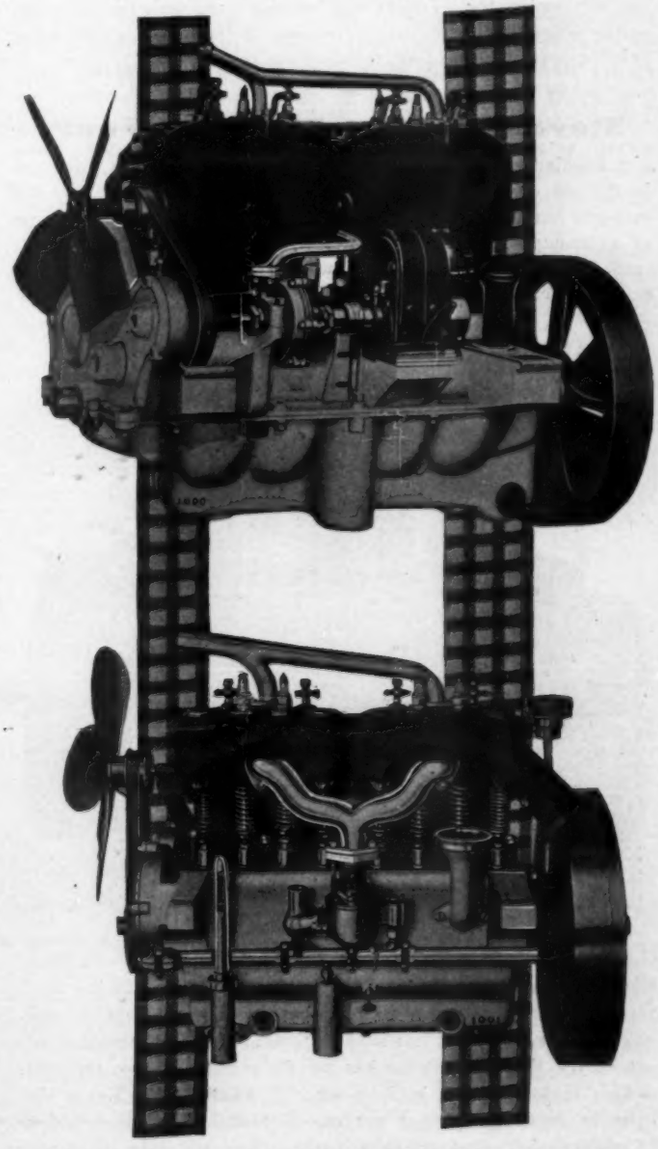
## Constructional Differences in Rae

Electrics are also well represented in the list of New England makers. Vermont has few, but that is the part from which the new Rae electric hails. In its victoria electric, many important differences in construction are to be noted.

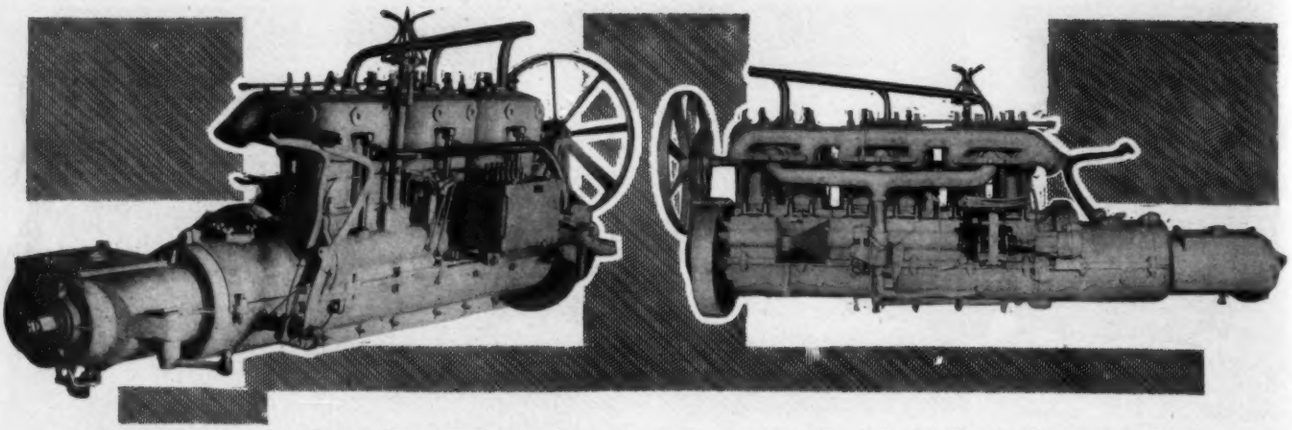
Besides the victoria, the company will have ready for the 1910 season equally well-designed coupé and runabout types of the Rae electric car. The factory is located at Springfield, Vt., but offices have been opened at 747 Boylston street, Boston.

The first machine, as shown at the electric show in Boston last month, had at that time run over 16,000 miles. In operation, it is claimed that this car will cover from 100 to 130 miles per battery charge, and irrespective of the number of stops.

By means of the control of this car, just brought out and patented, the starting and accelerating effort is produced by a normal discharge current, thus conserving the energy stored in the batteries and making a larger percentage of it available.



Two Lambert Motors: Above, Model L; Below, Model H



A Leader in the Adoption of the Unit Construction, Stevens-Duryea Simplifies It by Placing the Flywheel in Front

Sixteen speeds, varying from 3 to 20 miles per hour, are furnished by the controller in its various positions, the operation being such as to vary the field of the motor without external resistances. Noiselessness is made a great feature, being secured by the use of special gears, on short shafts, the latter being mounted upon radial ball bearings. They are well enclosed and run in oil at all times. This enclosing the gears in an oil bath, not only makes for noiselessness, but materially aids the longevity of the gears themselves, to say nothing of the matter of reducing friction losses to an absolute minimum quantity.

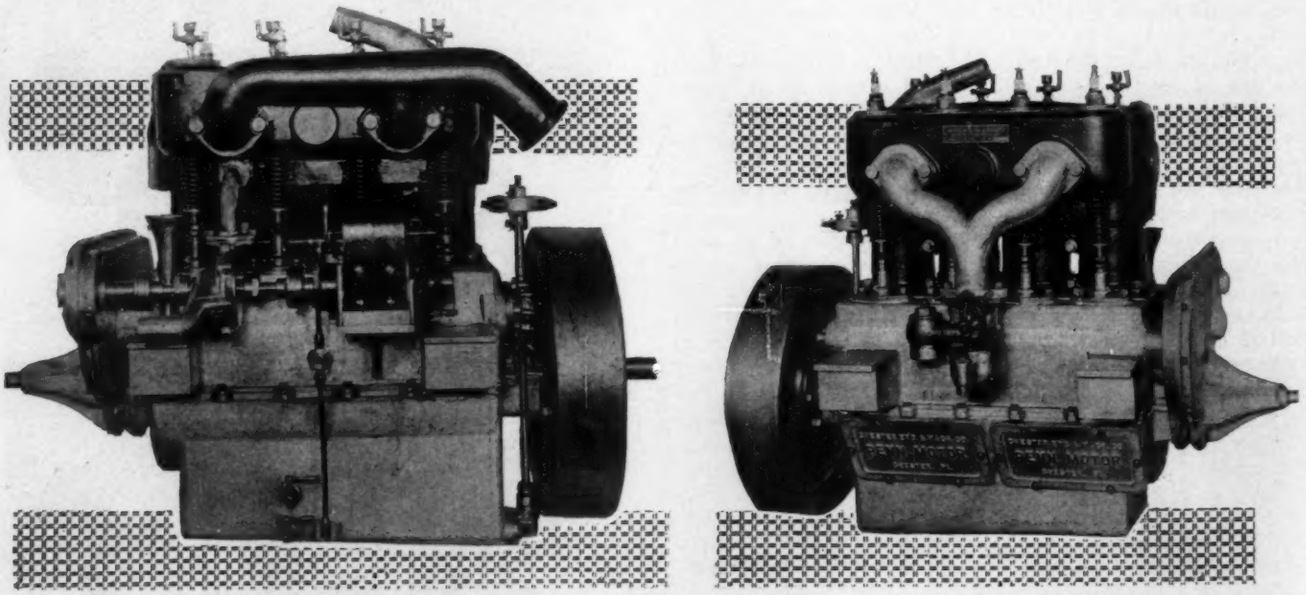
## Stevens-Duryea Sixes and Fours

Six-cylinder engines have had at least one steadfast adherent in the Stevens-Duryea Company, Chicopee Falls, Mass., and the season's output will contain a good representation of that type of motive power. In addition to this, the New England concern has advocated the unit power plant with three-point suspension ever since 1904, and the cars for the season of 1910 will all contain a power plant constructed along these lines. Such was the clarity of the original ideas in both that no changes have been made from that time to this, and as the present product shows, the construction has not been altered from the first.

This season's leader will be the old standby, Big Six, a six-cylinder forty-horsepower car called Model Y, with cylinders of 4¾-inch bore and 4½-inch stroke. As a standard equipment this will have a roomy seven-passenger touring body. Then there will be two "fours," differing mainly in the bodies and the little changes that go with the different bodies.

### MOTOR SIZES AND POWERS

Model Y is powered with a six-cylinder engine of 4¾-inch bore by 4½-inch stroke, rated at forty horsepower. The cylinders are cast in pairs, with integral water jackets and valves located all on the left side. The construction is so planned that nearly every part ordinarily removed may be taken off without disturbing the others. Thus, the exhaust pipe rises above the exhaust ports and passes across the upper part of the cylinder, while the inlet pipe drops down below the line of the openings, in this way making each pipe removable without disturbing the other. The carbureter is made integral with the lower part of the intake pipe, and can be removed with it. Similarly with the magneto, which is located at the rear on the left side opposite cylinder number six. This is driven from the two-to-one gears at that end of the engine through the medium of a small universal joint, which relieves all strain upon the armature shaft and allows its easy removal.

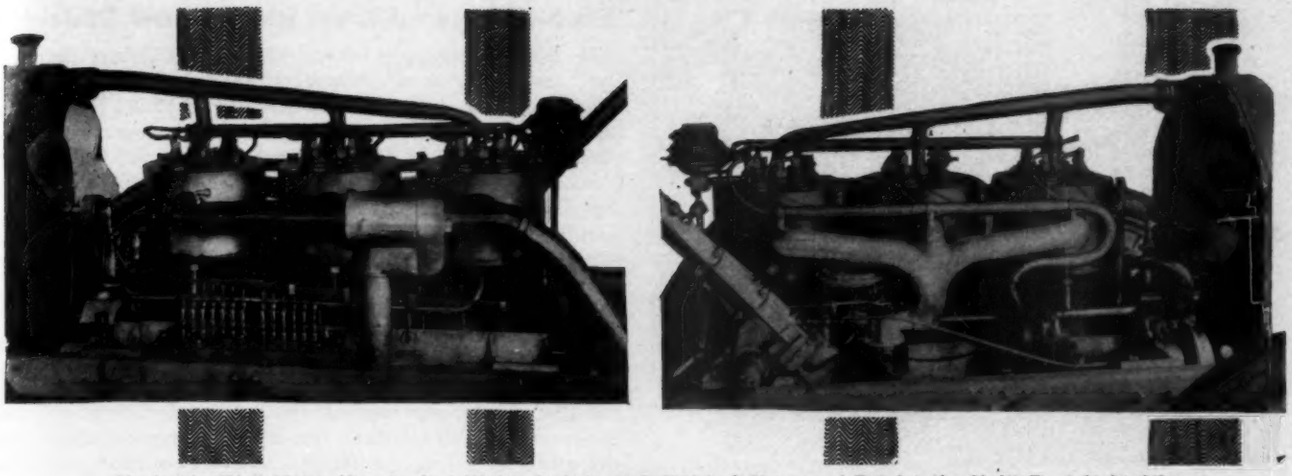


Penn Motor Is One of the New Block Types, with Valves Oppositely Disposed, Which Has a Three-Bearing Crankshaft

## Alden-Sampson Commercial Cars

Interchangeability is the goal toward which the Alden-Sampson Manufacturing Company is struggling, the statement being made relative to the product that every part of the "Sampson" truck is designed and built at the factory of the company, and built to jigs and fixtures which guarantee every piece.

During the comparatively short time since the Alden-Sampson Manufacturing Company, of Pittsfield, Mass., developed and



Chadwick "Six" Motor Has Applied Water Jackets of Cylindrical Shape and Retains the Multi-Feed Sight Oiler

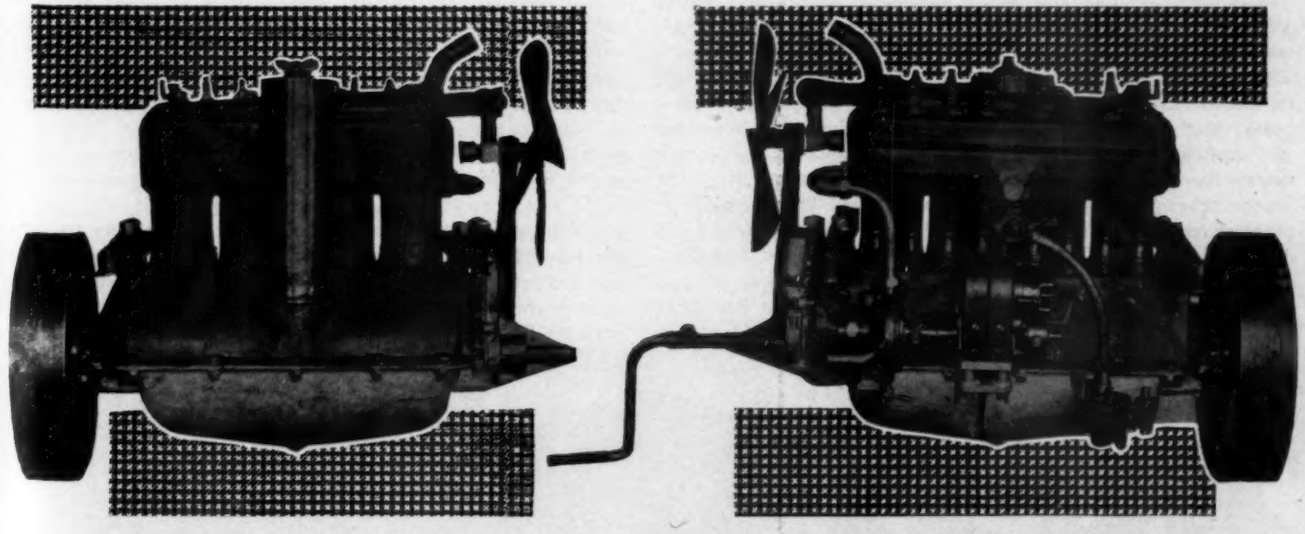
placed one of its four-ton trucks under test in their Motor Transportation Company in Boston, the trucks have excited a tremendous interest among our industries, whose engineers saw at once that here was a truck which embodied ideas and points in design neglected in others, and which seemed to have been designed with the idea that a truck, though doing rough, heavy work, was yet necessarily a machine of fine parts and fine materials, which ought to be protected in their workings to insure economy.

Considering the short time since its development the sales have been most gratifying and the interest shown through inquiries is constantly increasing.

The few points of design and workmanship outlined will show that the effort to build the best and to greatest advantage of the user is always of universal interest. The engine is of 5-inch bore by 5½ inch stroke, and is governed to run at about 925 r.p.m. It is designed and built by the Alden-Sampson Manufacturing Co. especially for truck severity.

in the torque rod support of the shaft-driven cars, the adoption of external and internal brakes instead of the double internal brakes previously used, and a refinement of the brake-adjustment mechanism. Aside from the features above mentioned the general characteristics of the Locomobile cars are similar in every respect. In the Model L 30-horsepower motor the valves are located on opposite sides, camshafts are one-piece drop forgings with integral cams, and the intake shaft carries the igniter cams of the make-and-break mechanism, which have a taper face so that by sliding the entire camshaft endwise the spark may be advanced or retarded. The crankcase is of cast bronze, with its lower removable portion of aluminum. The train of gears operating the valves, pump and ignition is inclosed and runs in oil.

A water-jacketed carbureter of Locomobile design is fitted, ignition is make-and-break, and the cooling system is comprised of a centrifugal pump, a honeycomb radiator and an adjustable belt-driven fan.



Block Construction Is Carried Further than Usual in the New Everitt, the Crankcase Upper Half Being Included

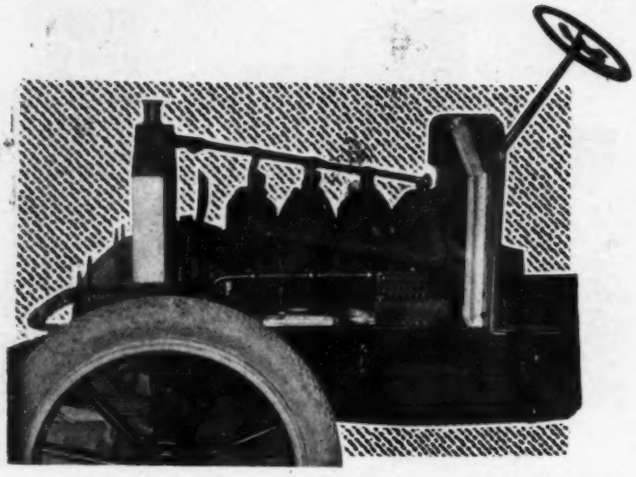
## Spiral Timing Gears for Locomobile

The Locomobile line for 1910 remains practically unchanged with the exception of a few improvements in regard to several mechanical details and the general refinement of the product. In the motor the timing gears are now of the spiral type instead of the straight spur gears previously employed; and with the exception of a change in the type of mechanical oiler used there are no further changes. All other mechanical features of the car also remain the same except for an improvement

## Unit Power Plant in Sultan Taxicab

In the taxicabs built by the Sultan Motor Company, at Springfield, Mass., the unit power plant idea is utilized, this serving to make the whole power unit removable in a very short time.

The four cylinders of this engine, 3-in. bore by 4¾-in. stroke, are cast in pairs with all valves located on the same side in single combustion chamber pockets and operated by a single camshaft fully enclosed within the crankcase, where it is at all times exposed to the fullest possible lubrication. The cylinder



Great Western Motor Has Separately Cast Cylinders

castings are imported from France, it being claimed that closer and more uniform casting can be obtained in this way. Grinding is extensively employed in the manufacture of these engines, all such parts as cylinder bores, pistons, wrist pins, crank and camshafts, etc., being finished in this way. A high grade of aluminum alloy is used for the crankcase upper and lower parts. All moving parts about the engine are either directly or indirectly carried by the upper part of this case, which is provided with four integrally cast arms by means of which it is attached to the subframe. The crankshaft has three long main bearings of good diameter and it, as well as the pistons and flywheel, is accurately balanced.

## New Grout in a Single Model

The reorganized Grout Automobile Company, Orange, Mass., will make but one model. This is offered as a five-passenger touring car and as a toy tonneau, the motor carrying four cylinders which are individually cast and which are 4¾ by 5 inches, giving a rating of 45 horsepower. The valves are interchangeable, mechanically operated, and both sets are on the same side. The lubrication system employs a circulating pump which is located in the bottom of the crankcase, there also being a gauge in the reservoir. The clutch is a leather-faced cone and the cooling is by means of a honeycomb radiator and a gear pump, the latter being driven direct from the camshaft. The motor bearings are of hammered babbitt and bronze, while in the transmission, which is of the selective type, Hess-Bright ball bearings are used. The axles are an I-beam in front and floating in the rear and use Timken roller bearings. There are two universal joints on the propeller shaft and a straight line drive is had through strut rods.

## Two-Cycle Atlas in Three Models

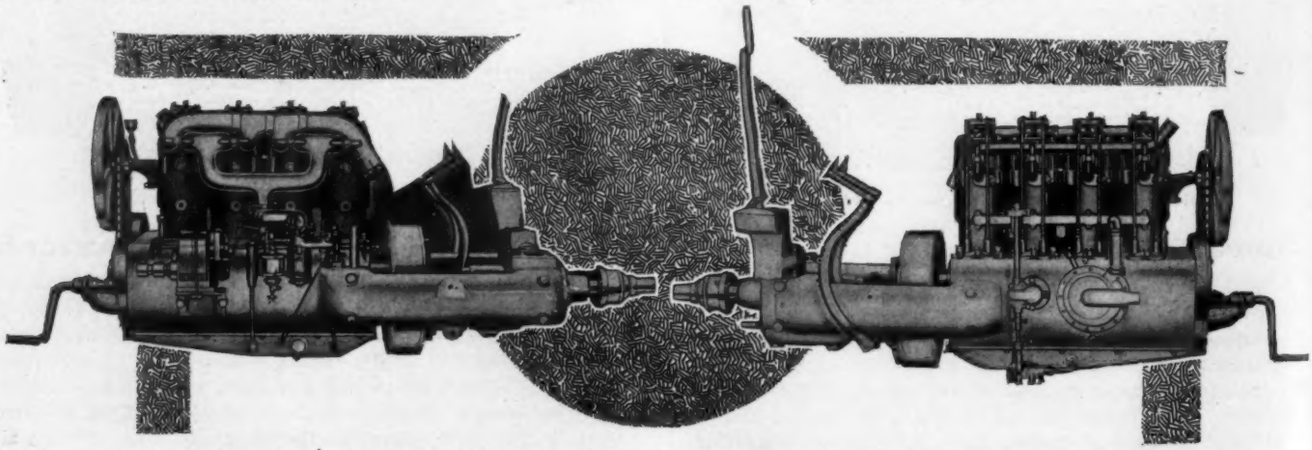
To the discriminating buyer, the makers of the Atlas two-cycle cars offer for 1910, three differing models, each with a two-cycle engine of suitable size and power. Model F, selling at $2,000, has a three-cylinder engine of 4½ in. bore by 4½ in. stroke, and is equipped with a five-passenger touring body. Model G has a four-passenger body, four cylinder engine with 5-in. bore and 5-in. stroke, and sells at $2,500. H has the same engine but a differing chassis, which with a five-passenger touring body sells at $2,500. In connection with the merit of this car, the selling organization of the factory, located at Springfield, Mass., puts forth the following argument why one should buy this product rather than other cars of a competing price and construction: The average automobilist to-day demands safety, comfort, silence, style, power, fair speed, simplicity, durability and low maintenance charge—and usually a fair price. The Atlas combines all of these features to a greater extent than any other car. First.—Safety. Every part of the engine and car is made of the best quality of material—thoroughly tried and tested under severest conditions. Second.—Comfort. Experience has shown that the three-quarter elliptic spring now being generally adopted and first used in this country on the Atlas cars gives the easiest riding car eliminating all side sway of the platform springs—the springs of the Atlas are extra long, three-quarter elliptic, made from imported Krupp silicomanganese steel, the best material known for this purpose—which, combined with the long 128-in. wheelbase, gives a car which for comfort has no superior. Third.—Silence. The absence of external moving parts makes the engine the quietest engine running. Fourth.—Style. Atlas cars are classy in lines, are highly finished and handsomely upholstered in hand-buffed leather with every convenience and comfort.

## Low-Priced Car from Waltham

In the Metz Plan car, the lower limit of automobile price has been reached, this being sold in parts, so that one may buy and assemble at leisure. This plan also allows of buying at one's financial convenience, and has many more advantages, some of which are well told by the makers, C. H. Metz, president of the Metz Company, Waltham, Mass. He says: "No argument will induce the man who longs for a palace and who has the means to acquire it, to put up with a modest cottage.

"The expense of maintaining our little car in comparison with the big tourist is in about the same proportion as the cost of dwelling in a cottage is to the luxury of living in a mansion.

"If it is a matter of how many miles per dollar for your automobile use and pleasure, we can figure as close as anyone in the business, and our statements can be substantiated. We do not pretend to tell you what you should purchase, but you owe it to yourself to ascertain which car will carry you the farthest with the least trouble and expense."



Massachusetts' Old Guard Includes the Knox, a Believer in the Unit Power Plant, with Other Original Features

## Stanley Steamers in Three Models

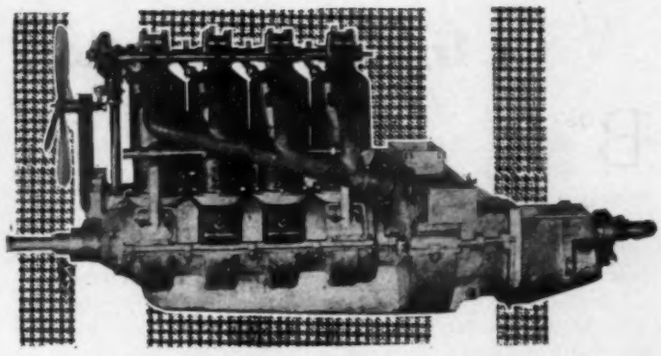
Newton, Mass., is the home of the Stanley Motor Carriage Company, which builds the well-known Stanley steamer. This is turned out in three models, known as "60," R, and U. All of these have two-cylinder double-action, simple steam engines. Model "60" has a cylinder bore of 3¼-in. by 4¼-in. stroke, using slide valves, the engine being located on the rear axle. All of this is true also of Models R and U, except for the engine sizes which are then 4-in. bore and 5-in. stroke. In every case the boiler is of the flash tube type. No condenser is used. There is no transmission, speed variations being effected by changing the speed of the engine. A wood frame is used, and ball bearings throughout, engine and both axles. Model "60" sells at $850 and has a two-passenger runabout body, 104-in. wheelbase, 56-in. tread, weighs 1,500 pounds, and has 34 by 3 in. tires all around. Passing on to the next larger model, R, this sells at $1,400 for a four-passenger roadster, with 114-in. wheelbase, 56-in. tread, and 36 by 3½-in. tires.

## New Car, New Plant for McCue

Among the past year's newcomers is the McCue Company, Hartford, Conn., which is building a four-cylinder car to sell at $2,750. This has a number of distinctive features among which might be mentioned the rear axle of special design. In the matter of design, the McCue 40 horsepower motor is most symmetrical, there is not a bad line to the unit and it is built as light as is consistent with hard service demands. The cylinders are twin cast, of the best gray iron, the water jackets are cast integral and are of very liberal dimensions. Even the valves are completely jacketed so that there is no liability to deformation of either valve seat or of valve head under hard continuous service. The cylinders are offset one inch, which together with the long connecting rods permits of slow speed under a heavy load with decrease in wear upon the reciprocating members. It is to be noted that this, the L type, sometimes called the Renault type of construction, is much in vogue in 1910 cars. The cylinder bore is 4½ in. and stroke 5 in.

## Newcomer from Bay State--Morse

Among the additional new cars of recent origin is the Morse, made at South Easton, Mass., by the Easton Machine Company. This car is made in two models, of the same price and on the same chassis. The engine is of four cylinders, 4⅝-in. bore and 5-in. stroke. The horsepower rating is 34.3, while the actual piston displacement is 336 cubic inches. Model B is a three-passenger runabout selling at $3,500. Cylinders are cast singly, while the valves are located in the head. The cooling water is circulated by a pump to a honeycomb radiator.



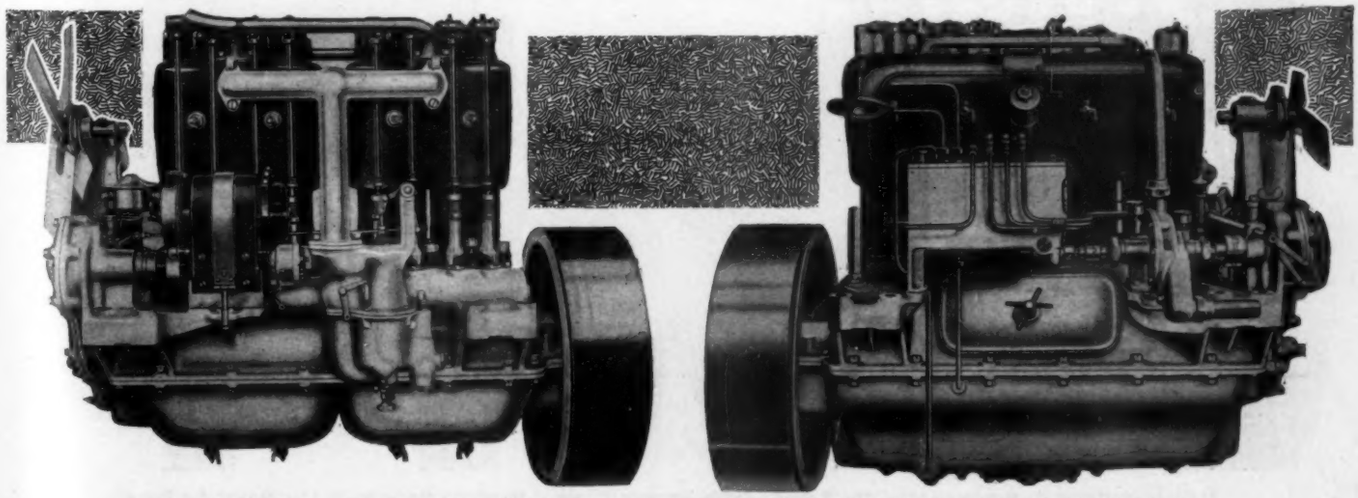
Freedom for Exhaust Is Secured on the Great Western

## Morse-Radio—New Englander

Of very nearly the same name, and approximately the same location, the Morse-Radio automobile, made at Springfield, Mass., by the Morse-Radio Auto Company, offers a chance of much business complication. Not that the chassis details agree, for they do not. The four-cylinder motor has a bore of 4¾ in. and a stroke of 5 in., giving it a displacement of 354 in. and a rating of 36.1. The only model turned out is equipped with a 5-passenger baby tonneau body, which sells at $2,500. Paired cylinders of the L type are used, with valves in pockets on the side, of course. Thermo-siphon cooling is through a cellular radiator with a fan as an auxiliary, the latter being driven by belt. A high tension magneto and dry cells furnish the current respectively for the two ignition systems. The contracting band clutch is of steel on a cast iron drum, while the transmission, which is located on the rear axle affords three speeds and a reverse operated selectively. The wheelbase is 112 in., while the tires are 36 by 3½ in. all around.

## Among the Foreign Contingent

The British Napier of which a touring car is illustrated, is made in 9 separate models ranging from 10 to 90 horsepower, within which classification no allowance is made for Napier special chassis work. The Napier cars have water-cooled motors with cylinders arranged in pairs, enclosed half time gears, and the company calls attention to the inlet and exhaust valves operated from a single camshaft on one side and many other features which are retained with a view to inducing silence. The ignition is by high tension magneto, gear driven and mechanically applied, with a view to quick replacement. In the transmission system both the fixed and sliding gears are mounted on castellated shafts. The clutches have metal-to-metal faces, are immersed in lubricant, and are not "fierce."



Pope-Hartford Is a Prominent New England Product, and Consistently Upholds the Valves-in-the-Head Idea

# In the Selection of an Automobile

BOSTON will be awarded the last comprehensive opportunity of the year to examine the various makes of automobiles, and in many respects the situation will be unique. In former years it has been the practice of makers to go to Boston with their best selections; to present the best foot, as it were and it is confidentially expected that 1910 will be no exception unless it transpires that this condition may be accentuated.

The New England autoist differs from his type in other sections of the country in many respects; he is imbued with mechanical ideas which are bred in the bone; appropriateness appeals to him, and art is far from a stranger to this section of the country. In a sense, Boston is the place where the makers go with their products for approval, and every attempt is therefore made by them to explain the reasons for the innovations of the year, to tell why some of the tried-out features were dispensed with, and to submit the whole to the court of last resort.

The exhibition at Boston will be under conditions which should prove to be more advantageous than otherwise. Most of the automobiles which will be seen there have been examined and discussed, after having been displayed at the shows elsewhere, and the various makers have been most liberal in their attitude as respects visitors to their plants, so that the information given and exacted has proven to be of a much more reliable character than that which appeared in print in former years.

## SELECTION IS ATTENDED BY DIFFICULTIES

The situation, despite the wealth of information at hand, is attended by difficulties, due to the large increase in the production this year, and the budding autoist who goes in for his "first" is bound to be more or less disconcerted. It is one thing to examine a given object and determine as to its value in a predetermined service, but it is quite another matter to go to a show, and, among several hundred automobiles, select the one which will represent all that money can buy.

It will not be easy to devise a system which will adequately serve the purpose, but it may be possible to help the situation, and the aim here will be to classify the motors, and introduce a "point system" which, if it is intelligently applied, may help out sufficiently to be worth while. It is believed that the power plant is of such great importance that it will be better to confine the idea to motors only, rather than to try to cover the whole situation, and, as a rule, the automobile which has a properly applied power plant, is so adaptable in other respects, that the purchaser is very likely to find it equal to all of his needs.

**Types of Motors Exhibited at the Palace**

| | |
|---|---|
| Air-cooled | 7 |
| Water-cooled | 231 |

**Types of Motors Exhibited at the Garden**

| | |
|---|---|
| Air-cooled | 4 |
| Water-cooled | 166 |

**National Show Power Plant Statistics**

| | |
|---|---|
| Air-cooled | 14 |
| Water-cooled | 336 |

**How the Motors Were Divided Into Schools**

| | |
|---|---|
| Four-cycle | 355 |
| Two-cycle | 15 |
| Six-cylinder | 51 |
| Four-cylinder | 276 |
| Two-cylinder | 17 |
| Single cylinder | 6 |

**Classification of the Cylinders Used in These Motors**

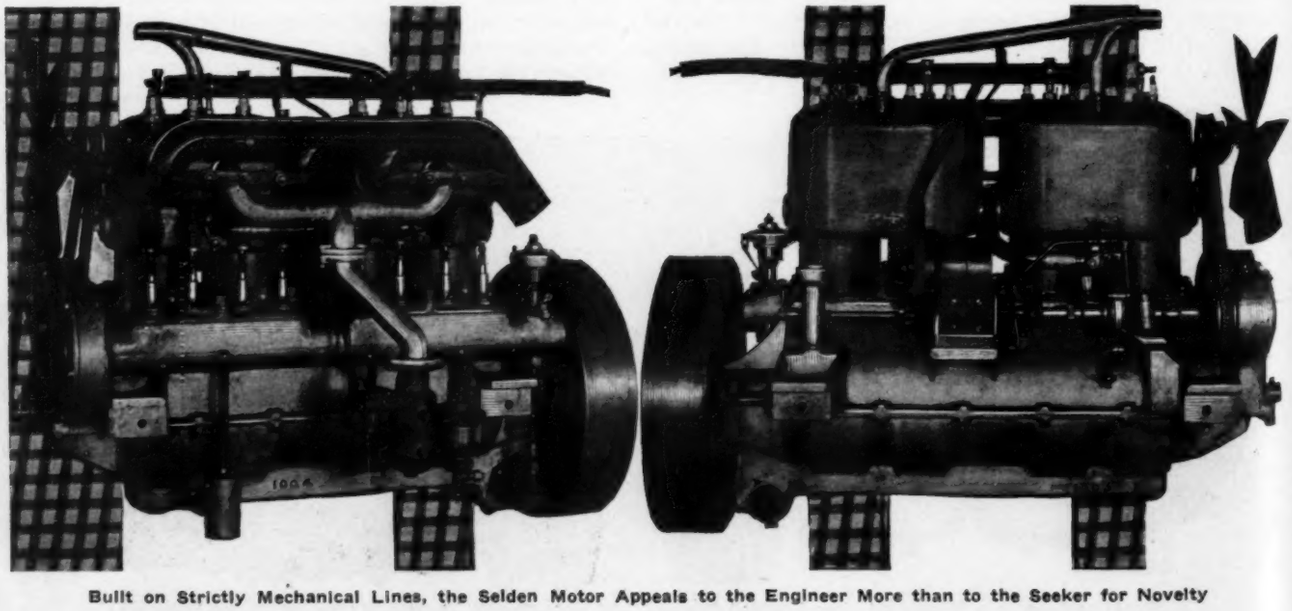
| | |
|---|---|
| Cast in pairs | 215 |
| Cast separately | 107 |
| Cast en bloc (4) | 26 |
| Cast en bloc (3) | 2 |

What was true at Chicago, comes near to holding for all the products of the year, although, as reported in THE AUTOMOBILE, there were some differences as between averages of the power plants as they were shown at the Palace, Garden, and at Chicago. As for the trend, it is difficult to reach fixed conclusions, but it is possible to say that, at the National Show, the count disclosed a falling off of air-cooled motors from 23 for the previous year to 14 as above recorded, which difference, in all probability, may be traced to the reduction of high-wheeled automobiles, in which type the air-cooled motor is much used.

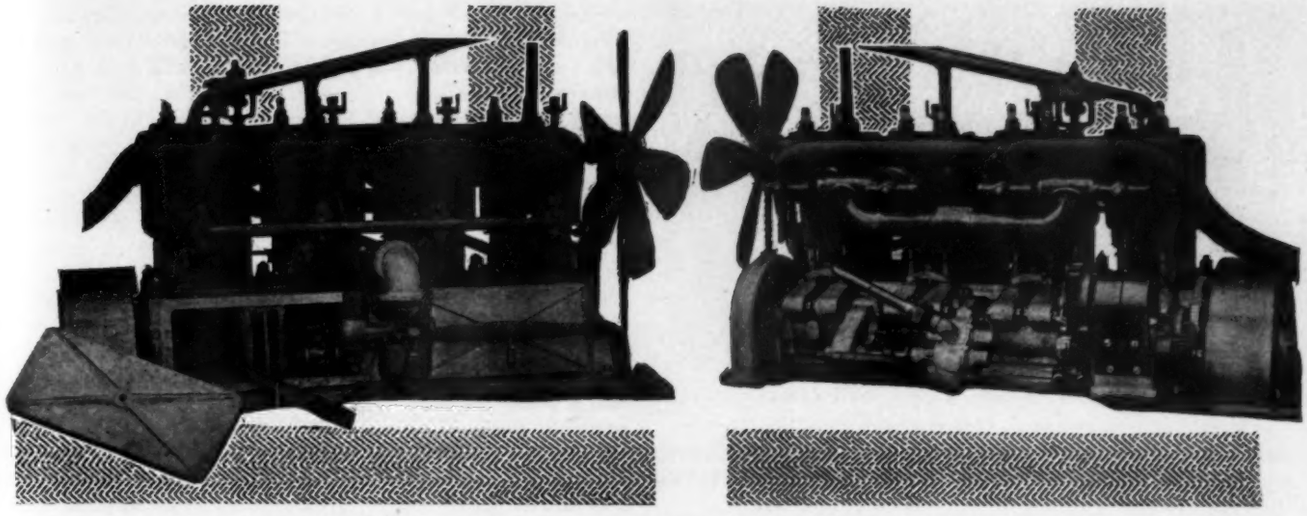
## TWO-CYCLE MOTORS ON THE INCREASE

That the two-cycle motor is gaining ground is certain, and a count of the motors of this generic type for two years, shows that where there were ten in 1909, there were fifteen at Chicago.

The two-cycle idea, while it always seemed to be worthy of careful exploiting, had the misfortune to fall into the hands of



Built on Strictly Mechanical Lines, the Selden Motor Appeals to the Engineer More than to the Seeker for Novelty



Corbin, from New Britain, Conn., Believes in Having the Cylinder Stroke Shorter than the Bore

motor boat builders of the class who did low-priced work, and, despite the difference in service demanded in automobiles, these motor designs were retained in some cases, with the result that, while the motors did fairly well, they did not quite come up to the best expectation. The black eye thus administered, although unfair to the good motors which maintained the status of two-cycle work, did exert a retarding influence, and it was not until this year that the atmosphere cleared up sufficiently to enable autoists to judge of the fullest capabilities of this type of motor.

### BALL-BEARING CRANKSHAFTS GOOD

It cannot be claimed that this type of crankshaft is being used very much, but the reason does not lie in lack of ability of the type. In every case involving the use of ball bearings, they proved capable, and it is because the plain bearings are also satisfactory that no greater headway has been recorded for the ball-bearing types—plain bearings are less costly.

As to the policy of employing the bearings of the least cost; it comes within the realm of good engineering; an engineer is a man whose skill permits him to get all there is in material, and accomplish the given task at the least possible cost. It is but half of the problem to make a thing work, and in commercial life, it is feared that an engineer without the ability to make material go as far as possible would fail.

### PLAIN BEARINGS ARE CAPABLE

Plain bearing crankshafts are used in three ways: (a) With a bearing on each side of each throw; (b) three bearings for a four-throw crankshaft; (c) two bearings only.

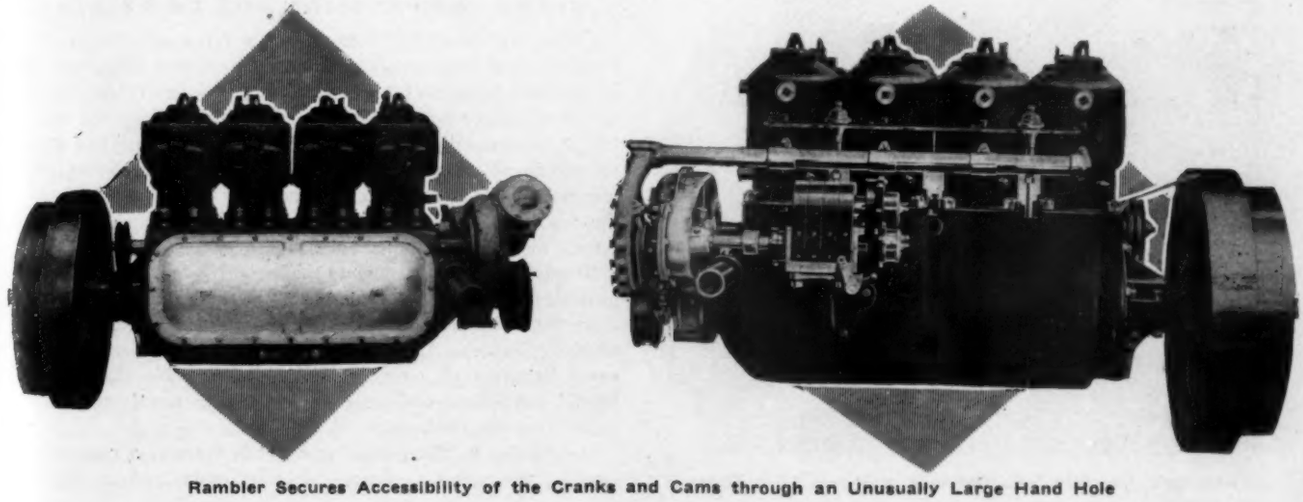
It is useless to argue that one of these types is better than the other without considering the quality of the material, design, and execution. The way to reason out this question is to note the character of the design and the other structural details, and to remember that, as in bridges, which are of divers designs, as cantilevers, suspensions, Howe truss, etc., if the designer takes all the factors into account, the results will be satisfactory.

### CAMSHAFTS ARE MUCH IMPROVED

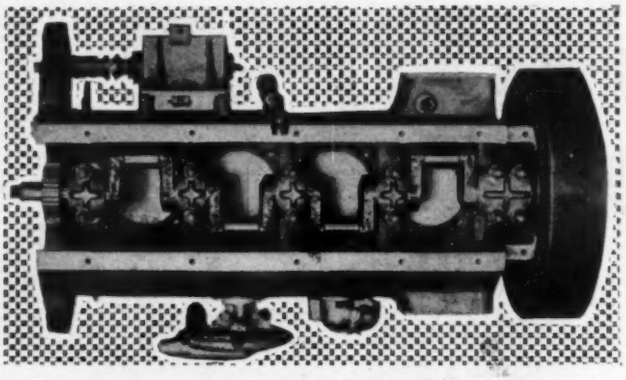
Accuracy of contour of cams, correct angular displacement of them, and matters of this sort, are of far greater importance than it is to have the cam-shapes conform to the constant velocity theory. It would be a nice idea were it possible to so design the cams that the gas would enter and exhaust at a constant velocity, but freak shapes are likely to result in noise and other troubles of a character which is beyond the skill of the autoist to cope with.

By taking advantage of camshaft grinders, which are now to be had, materials of the hardest character may be used. The process of heat treating and straightening may be conducted before the camshafts are finished. The great endurance of the material after hardening is no bar to quick and accurate finishing. It is just possible that the finishing may be hastened, owing to the rigid character of the material which is reason for its ability to stand back of the grinder in the final process, and the tools during machining.

In the setting of valves, overlapping is now practiced as never before, that is to say, the inlet valve is opened before the exhaust valve is closed, and in this way the inertia of the gas is taken



Rambler Secures Accessibility of the Cranks and Cams through an Unusually Large Hand Hole



Good Example of Five-Bearing Crankshaft Construction

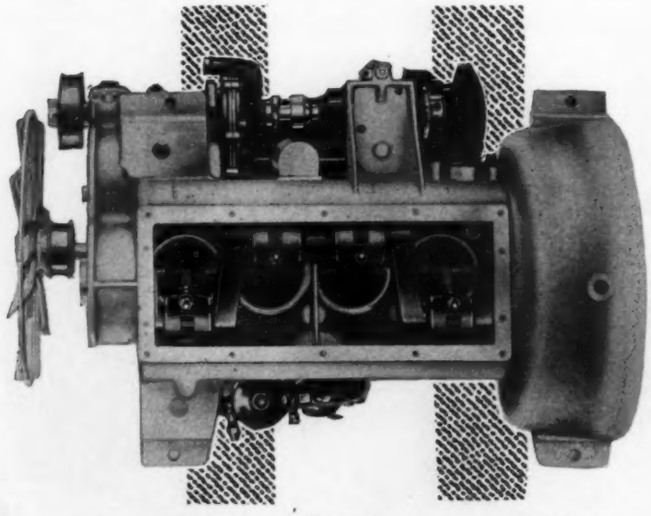
advantage of. This practice demands careful and nice designing, and the very fact that it is practiced is assurance of the growing quality of motors.

The sizes of valves are about on a par with last year; the designers who prefer the large valves make adequate provision to eliminate the noise which is likely to be induced, although, considering high compression, and high speed, which are companions to large valves, the power of the motors for a given bore and stroke, is greater. It is the general practice to so design motors (large valve types) that the valve diameters are equal to half the bore, and bevel seats for valves are prime favorites.

### VALVES ARE VARIOUSLY LOCATED

In some of the earlier racing types of motors again in power resulted when the valves were located in the heads. The intense heat in this location made for trouble, but this tendency was counteracted, and it then became commercially possible to take advantage of the noted increase in power. This type of motor is conspicuous this year, and the reports from it are so thoroughly good that it promises to be perpetuated. In some of the designs of this type the valves are in cages, and they may be readily removed when it is found necessary to clean or grind in the valves. In the Knox type, which is a distinct and clever innovation, the head is separable, and when it is desired to clean out the combustion chamber, all that is necessary is to remove the nuts from the holding bolts and lift the heads off; room is then at hand in which to work a scraper.

When the valves are in cages, and with a view to thwarting the ills of excess heat, the cages fetch up on flat seats and have room to expand. The cages are made of cast gray iron of a grade which compares favorably with the iron used in the cylinders and pistons, and packing is done by grinding. The practice,



Chalmers "30" Has Two Bearings of the Annular Type

considering the T and L head cylinders, is not very different from last years; the compression may be a little lower considering a struck average, and the valves may be a little greater in diameter. It is just possible, too, that bushings are more freely employed for the stems to reciprocate in, but it is not admitted by many of the most advanced designers that this practice leads to any special advantage. The valve action seems to be satisfactory in either event, and as for the valves becoming too loose in the guides, there seems to be little chance of it. As an instance of the durability of cast gray iron under the conditions as here reflected, it is enough to point out that motors have been examined after eight years of service and when they were taken down to ascertain the extent of depreciation, the wear of the valve guides was found to be negligible.

Adjustment is more carefully provided than in earlier designs, and it is now the belief that the adjustment should be very nicely made, or the system should be without means. In the absence of a means of adjustment, there is nothing to jar loose. Valve springs are stronger than was formerly considered desirable; this advantage, for such it proves to be, is not attended with a great disadvantage in view of the quality of cams and rollers as now made. It has been determined that the quicker closing of the valves, due to the stronger springs used, adds materially to the power and efficiency of the motors. In some of the earlier types of motors it was nothing to observe a camshaft rotation of even 40 degrees during the seating of the valves. At the present time the camshaft rotation is, in the better examples, on the efficient side of 20 degrees.

### RECIPROCATING PARTS ARE LIGHT

When a member is balanced, according to the popular conception, it will stay in any position in which it may be placed, but it is not generally appreciated that this condition of static balance is of no avail. Just so soon as rotation is set up in a member, it then partakes of kinetic properties, and, unless it is in a state of kinetic balance, vibration will set up, and this vibration is but the visible manifestation of a more serious condition—kinetic strains are induced in the member, and they increase as the square of the velocity.

It is this kinetic ill which is at the bottom of most of the crankshaft failures, and in any attempt to determine how good an automobile may be, it is necessary to observe the condition of kinetic balance. Makers, who value their reputation, can scarcely be expected to disregard this highly important matter, and it is this hidden structural consideration which has been attended to by the makers of the best automobiles of the year.

The best condition of the kinetic balance will be observed in the motors which are provided with well-designed reciprocating parts, and especially if each reciprocating part is to an exact standard of weight. Good material then nice design features, and finishing to exact drawing size, is what is aimed at.

### TIGHT COMPRESSION DUE TO GRINDING

Cylinder grinding has been in vogue for several years. It was formerly looked upon as a process which was only resorted to in the manufacture of high-priced automobiles. This year, from an actual inspection of fifty-five plants devoted to the manufacture of automobiles, only one was found which was not equipped to grind cylinders. In this case the grinders were actually ordered and it was expected that they would be in hand for the year's work. Grinding is a quicker process, and for this reason alone it is adapted.

Grinding, besides reducing the time of finishing, is the best possible assurance that the bore will be of perfectly uniform diameter, even though there may be hard spots over the surfaces of the cylinders. In casting cylinders the metal will not be of equal hardness all over, and while all possible skill is utilized "chill" conditions will creep in, and white metal will gather at zones over the surfaces.

In addition to this condition of chill there is a certain proneness of the metal to remain soft in spots, and in boring the

cutter will dig in deeper at soft and back off when hard spots are encountered. Grinding has none of these drawbacks; the surfaces are ground off at the same rate, irrespective of the hardness of the metal, and inequalities, although scarcely noticeable to an observer of little skill, will allow gas to leak by.

Since grinding is the quickest way to finish cylinders, it is the best possible guarantee that this process is followed in the low priced automobiles as well as in the more pretentious efforts. The cylinders are first wrought, bored, and then mounted in a fixture, or bolted to an angle plate on the platen of the grinder, where the final finishing is done. Pistons are also ground, and the allowance for expansion due to heat is very carefully cared for. Expansion allowance has not been reduced to a standard basis, and this, as well as a number of like details, will have to be given a little attention in the long run.

The piston rings, of which most motors are provided with four for each piston, are made of a special mixture of cast gray iron. The rings do not have to be of great section, and so fashioned as to press heavily against the walls of the cylinders. In some of the earlier designs of motors the "pumping losses" reached the enormous figure of 1 1-4 horsepower per piston ring used, and the mechanical losses were excessive.

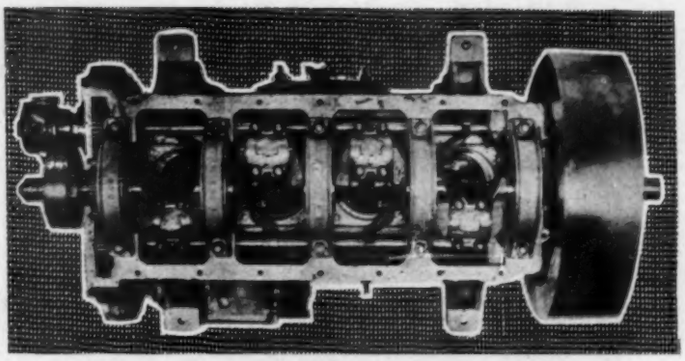
In the absence of skill borne of experience, this condition is bound to creep in, and "paper experience" when it comes to matters of this sort, is worth very little. It is on account of this, and other similar matters, that motors, if they are given a displacement rating, will scarcely be on a fair basis of comparison. There is no way known to engineers by which the factor "skill" can be introduced into the formula, and in the absence of this, the accurate way to ascertain the true rating is to test it.

This, and many other reasons, are at the bottom of the problem which is bound to confront the man who goes in quest of an automobile nor is it likely that the time will ever come when the search may be conducted without having to allow for the personal equation. The nearer the approach to a standard, the less will be the hazard, and, while it cannot be claimed that automobile motors are even approximately on a standard basis, they are sufficiently perfected, taking them as a whole, to assure purchasers that the difference between the worst example and the best motor is nothing like what it was last year—each successive year brings its quota of refinement in this respect.

## POINTS OF MERIT IN SELECTING A MOTOR

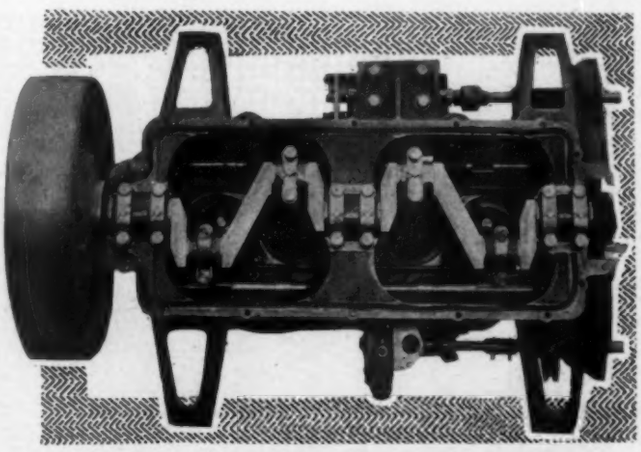
Were the whole matter put on a civil service basis, the points of merit might be approximated as follows:

| Conditions to be considered. | Points. |
|---|---|
| For each year of service rendered | 5 |
| For a tight compression without an oil seal | 10 |
| For each 10 degrees reduction of the temperature of the cooling water below 212 degrees F. (to 170 degrees F.). | 10 |
| For each one per cent increase in thermal efficiency | 10 |
| For a straight line torque performance up to 1,000 feet per minute of piston travel | 20 |
| For accessibility, ease of adjustment, etc. | 20 |
| For each reduction of 1,000 pounds per square inch of extreme fiber strain due to secondary moments at 1,000 feet per minute of piston travel, measuring the strain at any point desired on the section of the crankshaft | 20 |
| For tight cylinders under a hydrostatic test of 500 pounds per square inch | 20 |
| For perfectly round and parallel cylinder bores | 10 |
| For noiseless performance | 25 |
| For absence of packed joints | 10 |
| Per pound per square inch of back pressure removed | 20 |
| Per pound of suction depression removed | 30 |
| For a securely fastened flywheel | 20 |
| For integral or equally secure cams | 20 |
| For a satisfactory wipespark system of ignition | 20 |
| For a satisfactory system of high tension magneto | 20 |
| For a satisfactory dual ignition system of ignition including a magneto | 30 |

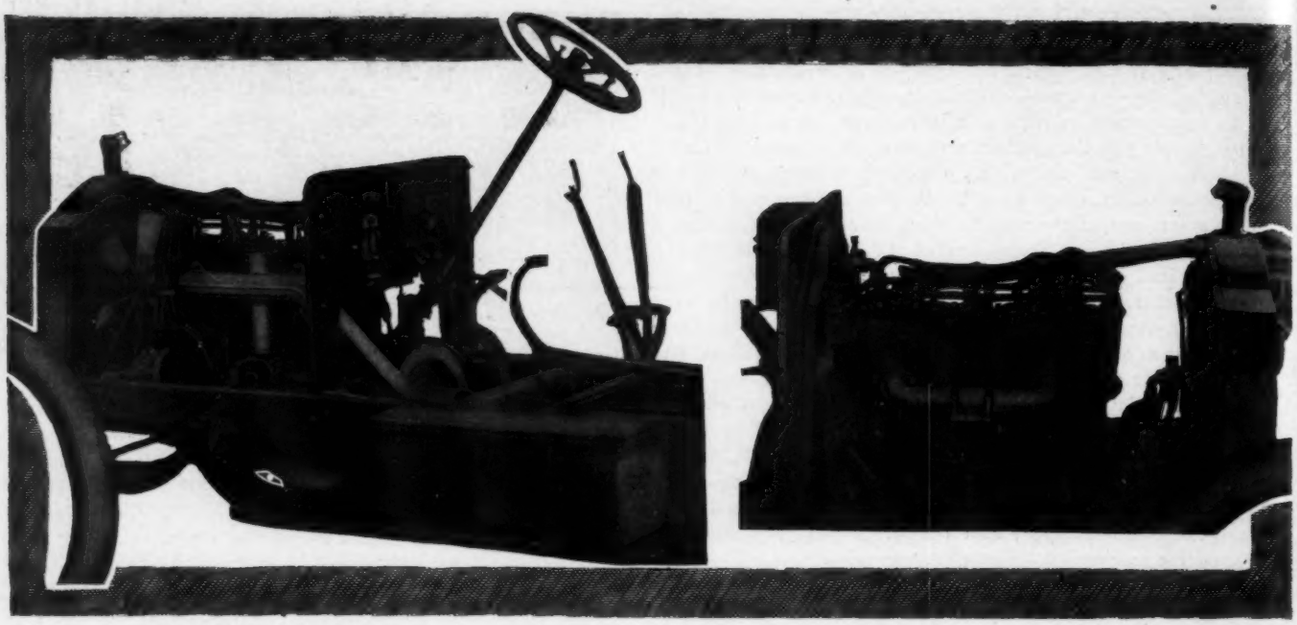


Crankshaft with Five Bearings of the Annular Ball Type

| | |
|---|---|
| For a satisfactory double system of ignition, including magneto and a multi-coil | 30 |
| For a satisfactory double system of ignition with a magneto and a uni-sparker | 30 |
| For an ignition system in which the wiring is run in a proper conduit system | 20 |
| For a carbureter which will deliver gas of uniform density at all speeds of the motor | 30 |
| For a motor which can be assembled and taken down without having to use a special wrench or tool | 30 |
| For a motor which will not pop back in the carbureter under any condition of mixture | 10 |
| For a motor which will start on a quarter turn of the crank in zero weather repeatedly | 100 |
| For a motor which will start on the spark repeatedly after it is shut down for a period of 10 hours | 100 |
| For general appearance and exterior finish | 20 |
| Considering a given gear ratio; for a motor which will accelerate the car it is placed to drive, from a standstill to maximum speed in the shortest time | 30 |
| Considering a given gear ratio; for a motor which will drive the car it is placed to drive, up a ten per cent. grade, on "direct" at 1-4 (or better) of the best speed of the same car on a level | 100 |
| For a motor which is positively lubricated and capable of running 10 hours without having to be attended to (no addition of lubricating oil) | 100 |
| For a motor without any exterior oilholes to be cared for | 40 |
| For a motor which will not leak lubricating oil | 10 |
| For a motor which will not smoke | 10 |
| For an installation which is tight enough to exclude dust (a satisfactory system of pans) | 100 |
| For a motor which will deliver the power required on a gasoline consumption of one gallon for each ten miles. | 10 |
| For each additional mile per gallon | 10 |



Three-Bearing Type, Exemplified by Premier, a Standard



Front End of Packard Chassis, and Inlet Side of Motor; the Radiator Filling Cap Is the Only New Feature

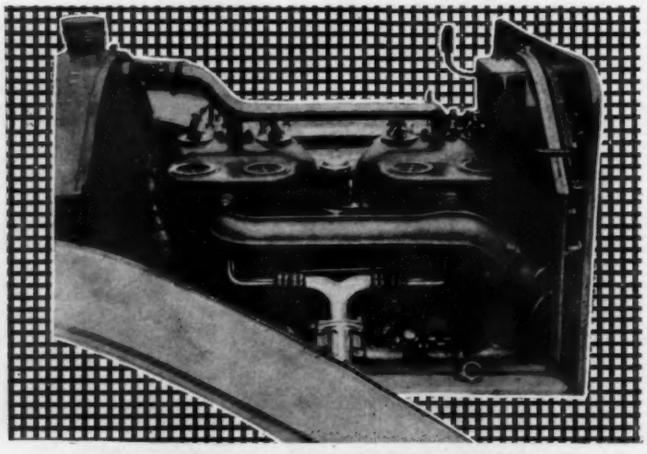
## SELECTING A CAR IS A PROBLEM

The above system of rating a motor assumes grave complications; it will take considerable time to so develop it that it will be fairly representative of the true situation, and it is highly improbable that any two engineers would agree that a given number of points will truly represent any given condition. The idea, for illustration, of giving 100 points to positive unattended lubrication for 10 hours, and only 20 points for tight cylinders under a hydrostatic pressure of 500 pounds per square inch, would lead to discussion, and it might be the consensus of opinion that the rating should be reversed.

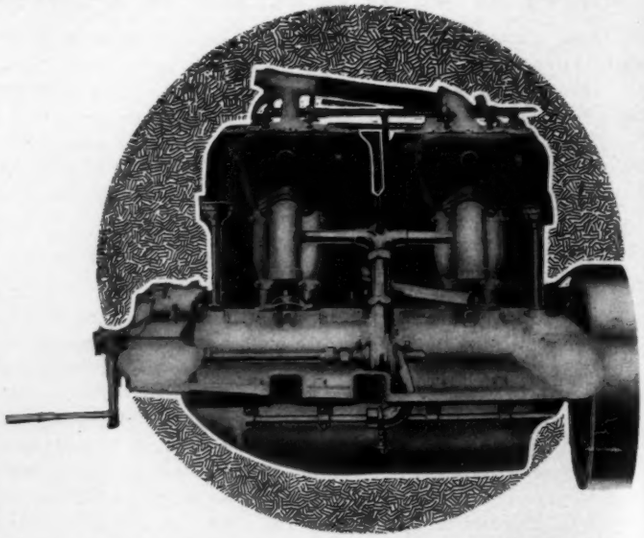
Considering the purchaser, however, he can ascertain for himself, if the lubricating oil will hold out for 10 hours, but he will not be in a position to note the tightness of the cylinders in a hydrostatic test. This being so, and in view of the importance of perfect lubrication, it does not seem out of place to make an arbitrary rating which will enable the purchaser to reach a conclusion which will reflect the life of the motor. The hydrostatic test is not so important to him, because he will be able to fall back on the makers' guarantee, if, after purchasing, the cylinders prove to be defective.

Noise, for illustration, is only rated at 25 points; this seems to be very low, and it would be, were the purchaser dull of hearing. If a motor is noisy the purchaser will be justified in the belief that it is far from mechanically perfect, and he would naturally not care to make an investment. Within certain limits, only, is a purchaser likely to deal in a noise problem, and considering this fact, the noise rating may be put down to a low level.

In the suggested system of ratings, the quality of material was not included. This would have been a very important matter two or three years ago, and from the makers' point of view it is always likely to be a serious matter. The purchaser, however, has no way of knowing the quality of the material used in a given motor, and he must be satisfied with the history of the make of car he decides to purchase, which history is represented in the five points allowed for each year of service the motor may have behind it. This allowance seems to be low, but the materials which can be purchased are all that can be used, no matter who builds the motors, and it is cheaper for the makers to use good selections rather than to risk reputation on the other kind.



Exhaust Side of Lozier Four-Cylinder Motor



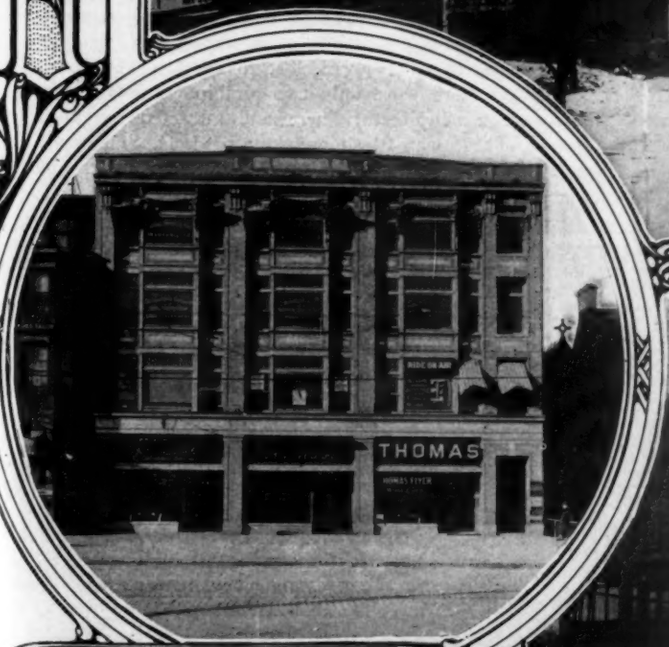
Rainier Has Separately Enclosed Valve Springs

Material will have to be handled by the maker, and the purchaser will have to be satisfied to accept the maker's guarantee on this point. Under the circumstances, it would seem useless to include materials in the point system, unless the purchaser can induce the maker to state definitely what the character of the materials are, and in terms which will be understood.

The New Boston Branch of the B. F. Goodrich Company.

New Home of Maxwell and Austin Automobile Salesrooms. Entire Building occupied by Automobile concerns.

Alvan T. Fuller Services Depot, Boston.

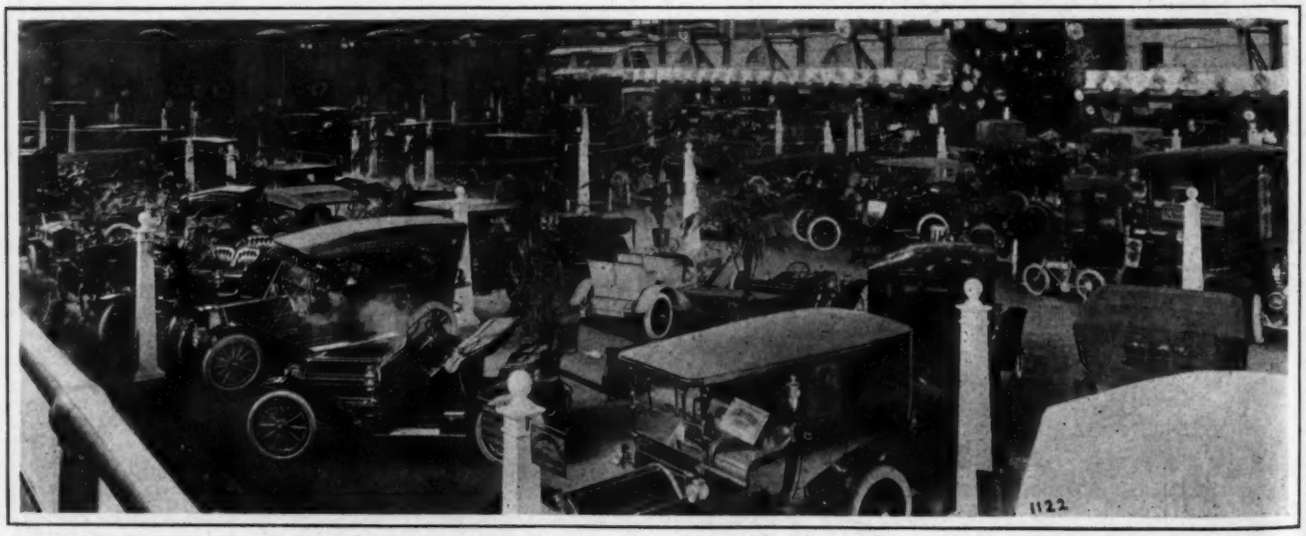



Another New Building for Automobile Salesrooms, Rainier, Locomobile, and Thomas Agencies.

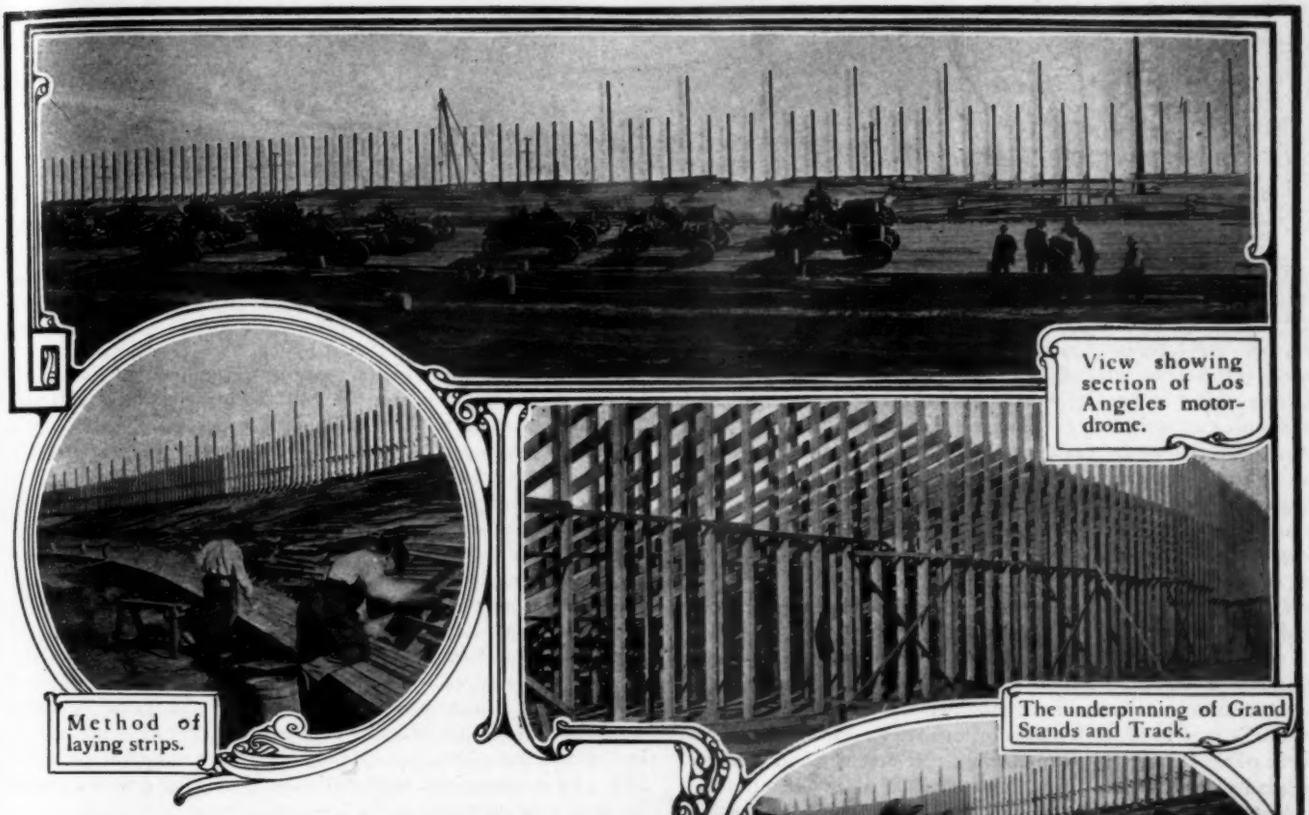

High-Vaulted Armory in Which Baltimore Show Was Held; in the Foreground Appear Mitchell and Stearns

BALTIMORE, Feb. 27—The Baltimore Show, which closed last night after being the center of attraction for five nights and four days, will go down in the city's automobile history as the greatest event of the kind ever held in this locality. It is estimated that not less than 40,000 persons paid their way into the Fifth Regiment Armory to see the big display. And it should be said right here that by all the visiting tradespeople, as well as local automobilists and dealers who have attended shows elsewhere, the Fifth Regiment Armory is considered one of the most suitable buildings for holding a real successful show. Although the exact figures cannot be had because of the tendency of some dealers to keep their sales secret, it is declared by the show officials that they were close to the $250,000 mark.

Although there were only two airship exhibits at the show, they were a new feature here and attracted considerable attention. These were the monoplane of J. H. Smedley, of Connecticut, and the biplane of two Baltimoreans, Dr. Charles S. Evers and William W. Southhard.




Another View of the Baltimore Armory, Featuring the Exhibits of Pierce-Arrow and National Machines



View showing section of Los Angeles motordrome.

Method of laying strips.

The underpinning of Grand Stands and Track.

Directors of the motordrome.
From left to right.
H. G. Feraud, Secretary.
H. G. Lombard,
Frank A. Garbut, President,
R. A. Rowan, Vice-President,
F. E. Moskovics,
Henry Keller and
Fred Feint.

Directly at the starting point.

## Constructive Features of Los Angeles "Dish"

EXPERIENCE with circular tracks to unit radius is but slight, although the principle has been incorporated into bicycle track work, and has always obtained, to some extent, in connection with race tracks in general. It is anticipated that this phase of the circle idea will serve the ends better than will be possible under ordinary conditions, for the reason that the radius of the curve will be greater than that which obtains in tracks composed of curves and tangents.

This will only be true if the radius of curvature of the circle is actually greater than the radius of curvature of the turns in tracks in general. In this case, the track is one mile in circumference, so that the radius of curvature is 840 feet, approximately. This means, however, that the automobiles, when traveling on this track, will always be under the influence of centrifugal force, to whatever extent their weight and speed, considering this radius, will induce—it is probably but slight.

The Indianapolis Speedway differs from the Los Angeles "Dish" to the extent represented by a plan which includes four tangents and four curves. In the Indianapolis undertaking the radius of curvature is minimum at 840 feet. This information permits of making a comparison which will show one point, *i.e.*, the centrifugal force will be greater when a car is making a curve on a track the radius of which is 840 feet than it will be on a track the radius of which is 1,684 feet. This does not necessarily mean that the speed of travel will be very much restricted considering the track of the shorter radius, because the minimum radius considered may not be sufficiently short to seriously influence the car performance.

The illustrations here given are sufficient to clearly bring out the points of construction, and for the rest the banks are uniform for the entire distance of the course in which the vertical height of the outer circumference is 14 feet 6 inches above the dattum line. The surface is made of 2x4 scantlings laid on edge, running lengthwise, and quite securely bound. It was the aim of the designer to give to this surface construction the characteristics of a flattened arch, with the idea that the underpinning would scarcely play a part. It is claimed that the surface structure would remain in place, unaltered, and sustain the required weight, were the supports extended between bents.

The grandstands are elevated 4 feet above the track, and the intervening space is a strip 4 feet wide for the entire front distance. A heavy timber construction faces the grandstand, and every provision seems to have been made, not only from the point of view of the safety of spectators, but the contestants as well. The grandstand and bleachers are only five rows deep.

The construction is progressing quite as favorably as could be expected, in view of the difficulty involved in procuring lumber which comes from Vancouver. The illustrations will tell of the progress already made, but there is still a shortage of perhaps 500,000 feet of lumber, and Constructor Prince, with his army of carpenters, eats up each shipment of lumber as fast as it comes in.

# Crossing the Atlantic with an Automobile

DIFFICULTIES in the way of transporting an automobile in running order across the Atlantic for a European tour were formerly regarded as almost insuperable; most persons preferred to buy or rent foreign cars after they had reached the other side. Part of these difficulties were due to the failure of the steamship lines to realize the importance of automobiles as an article of freight, and part to the ignorance of the private owners of the various formalities required in the conduct of international traffic. The steamship companies have thoroughly reformed, however, and now offer every facility. Customs formalities and others have been considerably mitigated, and, if desired, can be conducted through the agency of any one of several clubs and corporations.

Thousands of American cars are now taken abroad every year, and each automobilist who tours in this way one Summer is sure to send several others across the next. As a way of enjoyably spending a vacation, and as a means of seeing the countries visited, touring *en auto* needs no further commendation. This season is sure to bring forth more tourists than ever before, and those of the number who are making their first trip will doubtless be glad of all the information and advice that can be offered.

As to the first requisite of an automobile tour, the automobile, little need be said. It will be taken for granted that the machine in question is of proved reliability, and ready for the hardest usage. The perfect roads of France and many other European countries tempt those who like to have the throttle just a trifle wider open than the other fellow, and the strains of long-continued high speed are apt to prove more disastrous to engine and running gear than the roughest American travel. Unless the car is of one of the makes which maintain foreign branches, ample supplies of spares should be taken along, to be ready for any contingency. If it is new this season, delivery should be secured far enough in advance, not only to secure against possible delays, but to run the machine several hundred miles and so to become acquainted with it and its peculiarities.

Little trouble may be expected from the various regulations covering automobile construction. Safety from fire and explosion, effective steering, two sets of brakes and simplicity of control are features of every machine with which one would be likely to attempt a European tour. The driver must be not less than eighteen years of age, and must give satisfactory proof of his ability to handle the car. These are the international rules adopted last Fall by France, Germany, Italy, Belgium, Bulgaria, Roumania, Montenegro, Servia and Monaco. In England, which is conspicuously absent from the list, the regulations are practically the same as in most States of this country; that is, any car can be used, providing the necessary fee is paid and the number carried, and any one can secure a driving license, also on payment of the proper fee.

A single certificate is good in any of the countries listed above as using the international rules, and the certificate can be secured in any one of them convenient to the tourist. In most cases this will be France, both because this is convenient in position, and because of the assistance afforded to the tourist by the Touring Club de France. The various examinations cannot of course be taken until arrival, but through the intermediation of the Touring Club they can be arranged for and the minimum of time wasted.

The customs deposits required before entering various countries can also be made with the Touring Club, which issues international *triptyques*, or certificates. Further than these none of the European countries have any formalities which affect the transportation of automobiles. Unless care is taken to observe the American formalities, however, the tourist on his return will find himself held up for payment of duty before he is allowed to land in his home country.

Most likely to affect the pleasure of the automobilist after his arrival on the other side is the care taken in boxing the car on this side. Satisfactory work in this respect requires no little planning. Few people appreciate the rough treatment which crated articles are likely to receive in loading and unloading. The railroad "baggage-smasher" is a familiar example of what a single man can do to a trunk or similar article; the steamship packers, with the assistance of steam cranes and derricks, can accomplish much the same result with a two-ton automobile. The crating must be done with this in view.

The accompanying drawing shows in longitudinal and lateral section a crate of ample proportions; it will be observed that the framing is considerably more substantial than would be required in the case of a house or shed of similar size. Three heavy beams or skids form the foundation; of these the outer ones are 4 by 6 inches, and the middle one 4 by 4. These are united at each end by a 4 by 4 cross-piece, and by three or four 2 by 4 pieces spaced between, corresponding to the joists of a house.

The vertical risers, or studdings, are 4 by 4 timbers at each corner, and three 2 by 4 pieces on each side. These may be braced by one or more diagonals, if desired, though this is not shown in the drawing. The risers at each corner are joined by 4 by 4 timbers all around. Thus every edge of the crate is a 4 by 4, or heavier. The top has three or four 2 by 4 cross-pieces. Good firm lumber should be used.

For the covering of the crate nothing less than one inch planking will do; this may be in any suitable width. For the top, as shown, in the drawing, 1½-inch material may be used to advantage, in the event of heavy articles being dropped on the top. The bottom planking is protected by two sets of cross-pieces, which in this case are on the outside. In putting the crate together it is well to consider the possibility of using it for the return trip. By a little forethought it may be made possible to have the crate "knocked down" into compact form and stored during the trip. In most cases this will save considerable expense, but of course is not worth while if the return is to be made by a port very far distant from that of entry.

To this end the crate should be considered as composed of six separate pieces, each forming one side. The plank covering of each side can be nailed down to the beams of that side, thus uniting them. Where the beams are joined together, in assembling the several sides, through bolts should be used, both for the sake of strength and for ease in disassembling. This may add slightly to the cost of construction, and it is for the individual to decide whether this is justified in his particular case. In many places iron corner pieces can be used to advantage. The drawing shows the planking for the ends nailed directly to the end verticals; this can be avoided by the use of a couple of vertical planks joining the planking together. The ends can then be bolted on as a whole. This also facilitates removing the car when the destination is reached.

After the crate itself is constructed, the installation of the car is a matter in which no little ingenuity can be exercised. It is necessary to preclude absolutely the possibility of the car breaking loose, no matter to what treatment the crate is subjected. Many steamships have hatches too small to admit a large automobile right side up, and so must lower the crate end on. Not

infrequently it is stored during the passage in the same position. The reasons for solid fastenings may then be appreciated.

The drawing shows a method which has been very successful, but individuals are cautioned against adopting it, as it is the subject of a United States patent granted to Edward Weinacht, of the Morris European Express Company, New York City, and used exclusively by that company for the crating of automobiles. The object here is to show the requirements of the case, in order that those who propose to do their own crating can act accordingly. According to this method, the wheels of the automobile are supported clear of the floor by blocks placed under the hub caps, and resting directly on the two main base pieces of the crate. The upper sides of the blocks are suitably recessed to take the hub caps, and are provided with heavy iron straps to bolt over them, thus securing the car. To add even greater security, diagonal pieces are wedged in between the axles of the car and the end cross-pieces of the crate.

For the automobilist who must devise his own method of fastening little advice can be given without the details of the car dimensions and construction. In most cases the plan must be worked out separately for each car. Knowing these requirements, namely, that the car must be so firmly supported as to become practically a part of the crate, a good carpenter can usually give a satisfactory solution.

Another method which is not patented, but the success of which depends largely on the car design, may also be described. Two pairs of internal cross-pieces are provided; one piece passes above and one below the frame of the car at both front and rear ends. The front frame extensions which form the spring hangers offer a convenient support at this end, the cross-pieces being passed between the spokes of the front wheels. The same method may usually be followed at the rear end, provided the car has semi-elliptic springs in the rear with long hangers. If not, the cross-pieces may be passed between the spokes of the wheels, one in front of and one behind the axle; the pieces being made of such width or so spaced that they are firmly wedged in. The cross-pieces both in front and rear may then be attached to the vertical studdings of the frame, which of course would be suitably spaced for this purpose. The cross-pieces, of course, should be padded where they come in contact with the car, so as to avoid marring the finish. This plan is merely a suggestion, but even if it cannot be adopted bodily it may help the individual in arriving at a satisfactory solution.

One highly desirable result is the support of the car weight clear of the tires. Standing in one spot for a week or two does not improve tires anyway, and many garages have arrangements for jacking up cars that are to stay more than a day or two. But in ocean travel the constant vibration and tossing of the ship is sure to develop a little looseness in the fastenings, and so cause the car to move to and fro slightly. This motion, if long continued, will chafe the tires in such a way as to weaken them materially, even if a blowout is not caused at the time.

Common sense requires that all moveable parts of the car should either be packed separately or so firmly fastened in place that there can be no danger of their coming loose. Seat cushions are especially offenders in this line, and are the more troublesome as few would suspect them. Tools, too, are apt to break loose. All gasoline and oil should of course be drained from the tanks before packing, as the steamship companies will not allow the former on board their vessels.

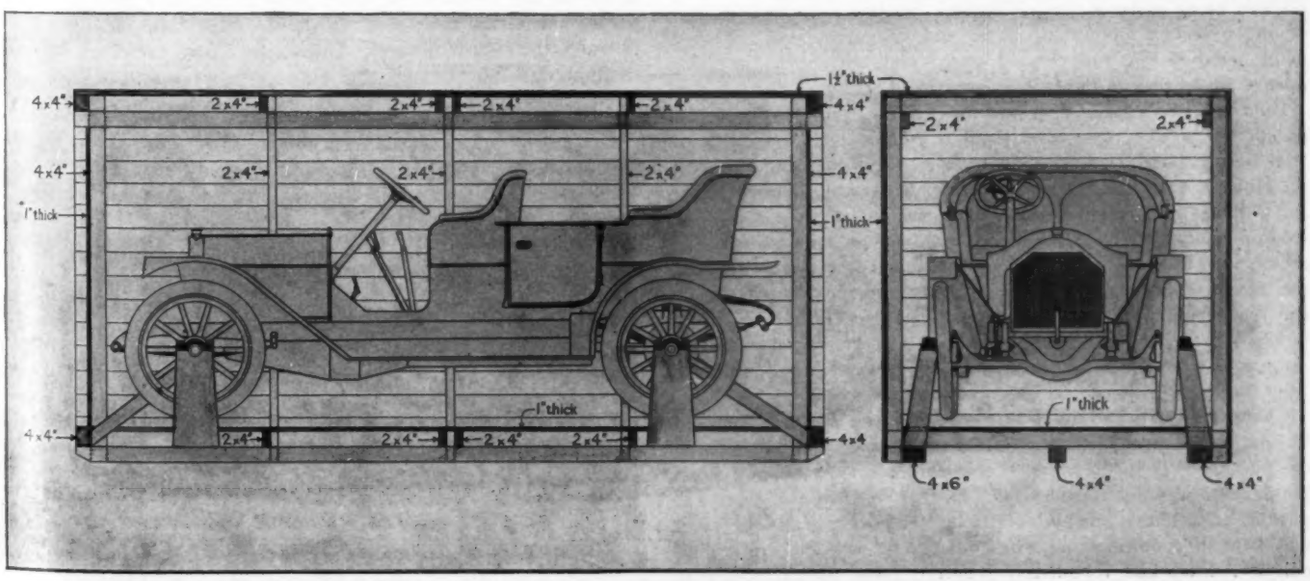
The dimensions of the crate naturally depend so much on those of the car that they cannot be indicated here. Tops and windshields should be taken off and packed as closely as possible. In general, for a car of about 120 inches wheelbase, the material required will be: 32 feet 4 by 6-inch timber; 104 feet 4 by 4-inch; 126 feet 2 by 4-inch; 434 feet (board measure) 1-inch planking, and 112 feet (board measure) 1½-inch planking.

The weight of the crate is a matter of indifference, for the reason that rates on automobile shipments are either made specially for the case, or else, under the "ship's option" privilege, are assessed not on tons of 2240 pounds, but on measurement tons of 40 cubic feet. On the latter basis the shipper will find himself rated at some 20 tons anyway, which leaves a pretty safe margin above the weight of the car itself.

One matter which should be called to the attention of those who intend to ship their cars by railroad to New York, there to be transferred to the steamer, is the custom of giving free lighterage on carload shipments. The railroad and steamship terminals at New York are so widely scattered that the cost of transfer between them often costs more than the freight itself. If an entire car is engaged for the railroad trip, which is often necessary anyway, the shipper is entitled to free transport or lighterage to any steamship pier in New York harbor.

The name and address of the shipper, and the destination, together with the words "touring automobile" or others equivalent, should be marked plainly on at least two adjacent sides of the crate. It is advisable not to mark them on with a brush, but to use a stencil with block letters clearly cut.

Nothing definite can be said about the freight rates which the prospective tourist will be called upon to pay, for the reason that these vary considerably from time to time. It will always be found advisable to have rates directly quoted by the steamship companies themselves, for an automobile of given over-all dimensions, and thus avoid misunderstandings.




**Substantial Crate for Automobile Shipment, Showing Application of Weinacht Patent Car Supports Under Axles**

# FROM THE EUROPEAN MAIL

## Flood Stops Work in French Shops

PARIS, Feb. 21.—Seventy-five per cent. of the automobile factories in the neighborhood of Paris were entirely closed down by the overflowing of the River Seine or stopped for lack of pure water and light. In the majority of cases the stoppage was directly attributable to their buildings being entirely or partially under water. For ten days 15,000 to 16,000 workmen in the automobile industry alone were without employment, and the damage amounts to several thousands of dollars. The monetary loss is not confined to the manufacturers, but is shared by their workpeople also, most of whom live near the river banks and have lost clothing and furniture in the floods.

At the present time all danger appears to be past, the water having settled so much that work has been partially resumed in several factories and preparations made for driving out the floods in the others. Within Paris the only firms to entirely escape the floods are Panhard and Delahaye, both of whom have their works on high ground far removed from the river. Except for a shortage of pure water, nothing interfered with their normal working. Mors, within the city, had to close down for ten days, with a couple of feet of water in most of the shops; it was impossible to reach the factory entrance except by boat. Sizaire-Naudin, in the immediate neighborhood, had little water within the shops, but such a quantity at the entrance that no workpeople could enter and no finished goods depart.

Most of the factories are situated on the banks of the river just below Paris, and it was here that the greatest damage was done. Renault had to close down entirely, all the surrounding country being under water. The river has now retreated, leaving behind a certain amount of water and still more mud. This is being pumped out and cleaned away, and the shops are being opened up as they become fit.

Gobron-Brillié, having everything on the ground floor, and practically on the river level, had to go under to the depth of four or five feet. Darracq, Saurer, Unic, Mercedes and Charron, all grouped together by the river side, had water in their shops for ten days at a height varying from two to six feet. De Dion-Bouton sought to fight the flood with pumps and motors, but seeing that the task was impossible beat a hasty retreat, raising the dynamos onto temporary platforms, moving the chassis to the rearmost buildings, and carrying whatever machinery could be transported to upper stories. Then the water rushed in, covering most of the shops to a depth of five feet and throwing almost four thousand workpeople into temporary idleness.

Clément-Bayard had six feet of water along the new highway leading to its fine factory. As the river-front buildings, however, are mostly given up to the workmen on the ground floor, the damage was not considerable. One of the steam engines was put out of business, but by building up temporary walls the other was kept in condition and work carried on without much difficulty. Anzani had fortunately removed from the river side to larger premises further inland. The experimental plant and stock left behind were utterly ruined.

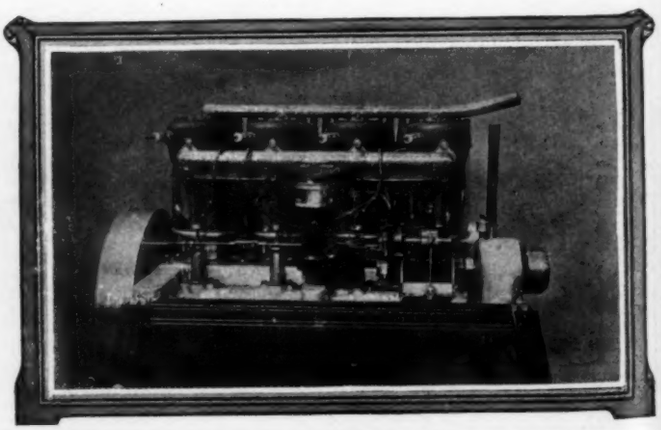
Further down stream, at the Hotchkiss, Delaunay-Belleville, and Aster establishments, considerable damage was done. The greatest sufferer, however, appears to have been Gnome, whose factories were completely submerged by the breaking of a dam. Many new American and English machine tools recently installed for the manufacture of aeronautical motors must have been almost entirely ruined by their fortnight's submersion. The Bosch magneto plant went under to such an extent that all business had to be transferred to the Lyons and other European factories. Nilmélior, among the magneto men, suffered badly, and Continental among the tiremakers.

## Joint Auto and Aero Salon in Paris

PARIS, Feb. 21.—In their determination to be free from the control of the Automobile Club of France, all the leading automobile constructors have decided to join with the aeronautical manufacturers in the holding of a joint automobile and aero show in the Grand Palais from October 15 to November 2. The aero salon was decided on and the date fixed several months ago, the event to be controlled, as last year, entirely by the manufacturers, without the assistance in any way of the Aero Club or other aeronautical associations.

The combination show is of recent date, and is the outcome of a failure of the automobile manufacturers to come to an understanding with the national club on the control of the annual salon. Possessed with the idea that the club did not adequately represent them as manufacturers, such leading firms as Panhard, Renault, Brasier, Grégoire, Delaunay-Belleville, Peugeot and Turcat-Méry broke away from a trade association under the tutelage of the Automobile Club of France and established the Syndicate of Constructors, to which only car constructors should be admitted, to the exclusion of accessory dealers, tiremakers, agents, body builders, etc.

This group had made a show in Paris impossible last year, but having learned that an annual exhibition is to their benefit, decided to hold one this year on reformed lines. They insisted that the joint committee responsible for the last eleven shows should be so transformed that the Automobile Club of France and its allied associations should be in a minority compared with the actual manufacturers. The club offered to retain only the same number of members as the new manufacturers' association, and to admit the cycle manufacturers, who would thus have a casting vote. The manufacturers refused to agree to anything less than the total submission of the club. This being refused, they approached the aeronautical constructors, who had already made arrangements for their show in the Grand Palais, and agreed to throw in their lot with them. Unless, therefore, the club consents to climb down and organize an automobile show on the lines dictated, this year's Grand Palais will be a combination salon.



Germain (Belgian) 100-Horsepower Motor for Dirigibles

The manufacturers have nothing to lose by their persistence in refusing to hold a show with the Automobile Club, for, as they represent not less than 75 per cent of the industry, a rival organization is impossible. The Automobile Club, on the other hand, after relinquishing all effective hold on the industry, is in danger of losing the nominal control the manufacturers are still willing to bestow upon it. If the manufacturers' joint show committee scheme had been carried through, the club would have still furnished the president and figured in the eyes of the public as the leader, although in a minority regarding management and the sharing of profits of the undertaking.

A joint show is not altogether new, for in 1908 the Automobile Club and manufacturers, who were then working together, arranged for two distinct exhibitions, one for pleasure cars only, and a second one, following immediately after, for commercial vehicles and aeroplanes. The shows were a success, although the partners felt that they were not mutually helpful, truck users having little interest in flying machines and aeronautical enthusiasts finding little to interest them in wagons and stationary engines.

Last year's aeronautical exhibition, the first purely aero show in Paris, succeeded in filling half of the Grand Palais, the other half being artfully boarded off. Taking into account the increases of business in matters pertaining to the air, it is certain that the aero section cannot be crowded into less than half of the Grand Palais, leaving only one-half for the automobile section. As in previous years they have found the whole of the large building none too spacious for them, it is difficult to understand how they will all find standing room without the use of an annex.

## Voiturette Stroke Again Unlimited

PARIS, Feb. 21.—No limit will be placed on the stroke of the small cars taking part in the next voiturette race, scheduled to be held over a distance of 350 to 400 miles on Sunday, June 19. Two years ago the bore was fixed and stroke left unfettered, the result being that cars were produced with single-cylinder motors having a ratio of stroke to bore of 2 1-2 to 1, or 3.9 inches bore by 9.8 inches stroke. Believing that the reasonable limit of long stroke had been attained, the organizers last year limited both bore and stroke, although still maintaining the ratio of 2 1-2 to 1. The change displeased small car specialists, some of whom declared that there was no further incentive to progress, and declined to take part in the race.

This year the old rules have come into force again, the bore of the small racing cars being fixed at 3.9 inches for one cylinder, 3.1 for a twin, and 2.5 inches for a four. The weight limit has been slightly increased to 1,433 pounds, with two-seated body, but without gasoline, oil, water, or spares. Demountable rims and wheels can be employed, and the mechanic can relieve the driver during the race if desired. No outside help must be given.

The race, which has always been won by a single-cylinder of 3.9 inches bore by 9.8 inches stroke, will probably this time be captured by a multiple-cylinder model. Designers are generally of the opinion that they have reached the limit in long-stroke single-cylinder models, but that there is still much to be learned in four-cylinder models with a ratio of stroke to bore that has not previously been thought practicable. Proof of this is found in the fact that one of the single-cylinder long-stroke specialists, who has been victorious in this race, is about to put on the market a commercial model having four cylinders of 2.7 inches bore by 6.6 inches stroke. This is practically a ratio of 2 1-2 to 1, hardly thought possible with racing cars two years ago.

If a motor with such a long stroke can be placed in the hands of the general public, what may be expected of the firm's racing models?

On the day following the race for the small speed monsters a speed test will be held over the same course for the same class of vehicle as sold in quantities to the public. The comparison will be interesting, for it will allow the public to judge of the respective merits of the special long-stroke cars and the medium standard models. If care is taken to see that the stock models are really assembled from series, it will give an excellent opportunity of comparing the special and the ordinary output of the firms competing.

Four-Cylinder Horizontal Aero Motor Made by Miesse

A Berliet Pumping Out Photographer Branger's Cellar

## French Imports and Exports Increase

PARIS, Feb. 21.—Although French automobile business with the United States has been steadily diminishing for the past three years, the official returns show that 1909 has been a record year in the matter of exports, surpassing even the high-water mark of 1907. During the past year America cut her expenditure for French automobiles by $600,000, and diminished them by $800,000 as compared with 1906. The dimunition can only be attributed to the development of the home industry.

It is the increase of business with England, Russia, Argentine, Belgium and Germany which allowed France to reach the record figure of $29,323,000 for the 12 months of 1909. The figures for the past five years are are as follows:

| Exports. | | Imports. | |
|---|---|---|---|
| 1905 | $20,104,200 | 1905 | $879,200 |
| 1906 | 27,570,800 | 1906 | 1,721,000 |
| 1907 | 29,072,800 | 1907 | 1,736,000 |
| 1908 | 25,459,800 | 1908 | 1,281,800 |
| 1909 | 29,323,000 | 1909 | 1,505,000 |

Although the exports have gone up, the imports, too, have increased, at least with relation to the preceding year. Germany and Italy, who formerly succeeded in selling a considerable number of cars in France, have given way to America, with Belgium and England in the rear.

# MERITORIOUS IDEAS FROM ABROAD

## Relation of Bore and Stroke

In the attempt—successful, by the way—to prove the absurdity of some of the catalog horsepower ratings in vogue in France, *Omnia* publishes an extensive list of cars on the French market, together with the bore and stroke of their cylinders. American readers, however, will be much more interested in the relations between the bore and stroke revealed by some of the figures.

Among the small four-cylinder cars rated at 10 horsepower are the Sinpar, cylinders 65 by 90 millimeters bore and stroke; Isotta, 65 x 100; Le Gui, 65 x 120; De Dion, 66 x 100; Hurtu, 70 x 90; Cottin-Desgouttes, 70 x 100; De Bazelaire, 70 x 110; Corre-La Licorne, 70 x 120; Cornilleau, 70 x 130; Luc Court, 70 x 140; Zedel, 72 x 110; Werner, 75 x 100; Vivinus, 75 x 110; Rapid, 80 x 130. Among the small six-cylinder cars are the Ariès, 60 x 110; Bazelaire, 70 x 110; Luc Court, 70 x 140; Delaunay-Belleville, 72 x 105; Bazelaire, 75 x 110; Ariès, 75 x 120; Peugeot, 80 x 110; De Diétrich, 80 x 120; C. G. V., 80 x 120; Clément-Bayard, 80 x 120; Cottin-Desgouttes, 80 x 120; Grégoire, 80 x 120; Napier, 82 x 127; Unic, 85 x 120; Delaunay-Belleville, 85 x 120; Brasier, 85 x 140.

Especially startling are the dimensions of the Luc Court, made in four- and six-cylinder models with cylinders of 70 millimeters bore by 140 millimeters stroke (2.76 by 5.52 inches). In the list of 58 six-cylinder cars there are but two in which the bore exceeds the stroke; namely, the 90-horsepower Napier, cylinders 6 by 5 inches, and the Rossel, with cylinders 120 by 110 millimeters. On three cars the bore and stroke are equal, the 110 by 110 Rossel, the 120 by 120 Darracq, and the 140 by 140 Itala. The longest stroke found on a six-cylinder car is 160 millimeters (6.3 inches), on the 50-horsepower, 100 by 160 Renault. Other examples of the long stroke are the 90 by 130 Panhard and Gladiator and the 90 by 140 Argyll (English).

## Hydrogen for Dirigible Balloons

French military authorities have had a new problem brought before them: how can hydrogen be provided for the military dirigibles in case of war? *L'Automobile* of January 15 has a serious discussion of the question by Jean de Raicevich, parts of which are quoted:

"It has been suggested that the Government draw up a map of France, indicating the location of chemical plants which might, in case of need, furnish hydrogen for our dirigibles. We doubt whether many would be found. Even if there were quite a number, however, the problem would be far from solved, for between the generating of the hydrogen as the product of a chemical reaction and the compressing of it in the steel tubes used for transporting it there is a considerable gap. And after the hydrogen is suitably prepared a service of automobile trucks or railways will be necessary to carry it to the point where it is needed. Capazza affirms that such a service has been organized in Germany. It is possible, for the chemical industries are much better developed on the far side of the Rhine.

"Some figures will suffice to give an idea of the difficulty of transporting hydrogen. The steel bottles in which it is stored weigh about 9 kilograms to the cubic meter of gas (2-3 pound per cubic foot). It is easy to see at what result one would arrive for the reinflation of a dirigible of a capacity of some thousands of cubic meters. For the average dirigible about half a dozen five-ton trucks would be required to transport sufficient gas."

## New French Alloy of Aluminum

A complex alloy of aluminum is described by the French journal *L'Electricien* which can be used as a bearing metal in place of brass and bronze. The ingredients are, besides aluminum, antimony, copper, tin, lead and zinc, and the following proportions are recommended: Copper, 1.2 per cent.; tin, 12 per cent.; lead, 0.8 per cent.; aluminum, 35 per cent.; antimony, 10 per cent., and zinc, 41 per cent. The extreme limits are: Copper, 0.4 to 1.25 per cent.; tin, 10 to 15 per cent.; lead, 0.6 to 0.85 per cent.; antimony, 6 to 10 per cent.; aluminum, 15 to 35 per cent., and zinc, 30 to 55 per cent.

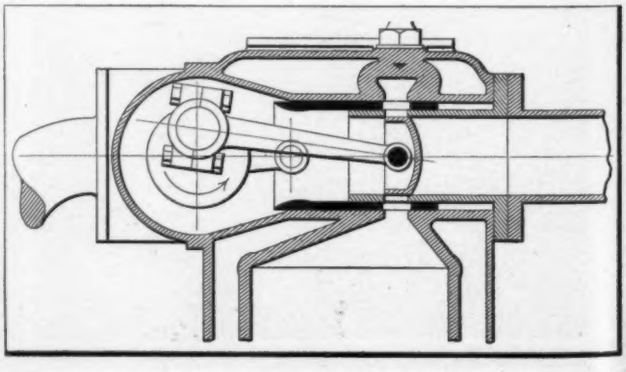
The mixing is accomplished by first melting the copper and adding the other metals one at a time. At each new addition the mixture must be stirred energetically with an iron bar and the fire allowed to go down a little. Toward the end of the operation the mixture is stirred no longer with the iron bar, but with a stick of willow or elder wood, which gives a more uniform mingling and accentuates the properties of the metal.

## Drummond-Bostock Piston Valve

Another example of the ingenuity with which English inventors are attacking the valve problem is the system invented by C. E. Drummond and F. J. Bostock, described in *Automotor Journal*, February 5. This valve works in more than theory, for a De Dietrich car so fitted has been on the road since last June.

The valve for each separate cylinder consists of a piston and a sliding sleeve in which the piston works; they are disposed horizontally across the head of the cylinder, and are actuated by a miniature crankshaft lying alongside the cylinders. This shaft has two cranks for each cylinder, one connected with the piston and one with the sleeve. The sleeve cranks are about a quarter of a revolution ahead of the piston cranks. The inlet and exhaust gases pass through the same opening in the head; the combustion chamber is elongated so as to form an annular pocket surrounding the valve mechanism. The idea is that during the compression and expansion strokes the opening is made tight by the sleeve, which is then at the outer limit of its travel; during the exhaust and inlet strokes the sleeve opens a passage, and the direction taken by the gases is then determined by the position of the piston valve.

The housing of the valve crankshaft is utilized as the inlet manifold, the gas being drawn around the lower end of the piston valve, which is then on the outer part of its stroke. The exhaust passes out over the head of the piston valve directly into the exhaust manifold. It will be seen that to maintain tightness it



Drummond and Bostock Valve Idea, with Piston and Sleeve

is only necessary to insure that this condition exists around the sleeve. To this end it is provided with external piston rings on its inner end, and internal rings on the outer end surrounding a stationary sleeve. But a very small amount of power is required for driving these valves; in the experimental car the valve shaft was connected with the crankshaft by a chain, and a 1-2 inch size was found perfectly satisfactory for this purpose.

Like most devices of the kind which have been brought out, this valve system lacks the cardinal virtue of simplicity. It has practically the same number of parts as the Knight valve, the difference being that one of the Knight sleeves becomes in this case a piston. The operating crankshaft and the connecting rods are exactly the same. In action it may be expected to be quite silent and to give ample valve openings.

## Torbinia Hydraulic Transmission

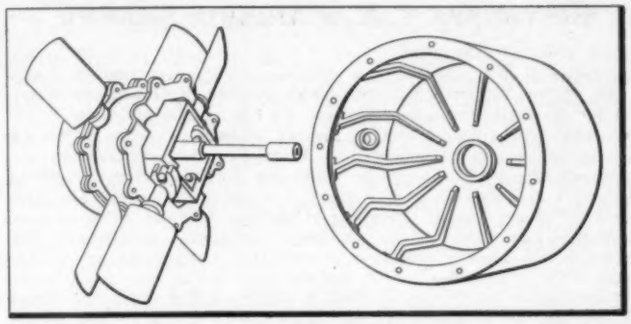
This new form of an old idea, which made its first appearance at the Olympia show at London, is the subject of an interesting article by T. C. Salsbury in *La France Automobile*. It is distinguished among similar devices by having neither pumps, pistons nor valves.

The principal elements of the device are a drum or cylindrical chamber of aluminum, provided on the inside with radial ribs, in which rotates a hub with a double series of blades which can take any pitch angle from zero to 90 degrees. Each set of the blades is practically the same as one of the reversible propellers commonly used on motor boats. When these parts are assembled the case is filled with a mixture of six parts of water to one of oil. The propellers being attached to the motor shaft and the drum to the drive shaft, the power is then transmitted by the drag of the liquid, set in motion by the propellers, on the ribs of the drum.

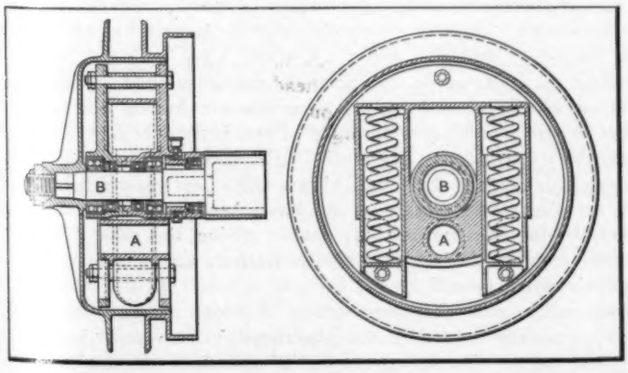
When the propeller blades are set at right angles to the axis of their shaft—with a pitch angle of zero, as it were—their movement is practically free, and the motor is running light. Giving the blades a slight pitch angle, by means of suitable linkage, enables them to set the liquid in motion, and so turn the drum and the drive shaft. When the blades are set at their maximum angle of 90 degrees, the adjacent edges of each pair meet, making one continuous blade or paddle. As the clearance between these paddles and the ribs of the drum is very small, this amounts practically to a positive direct drive.

The great novelty and merit of the device is the arrangement of the propeller blades in pairs, with each of the pair working in the opposite direction from the other. In this way the end thrusts which would be set up by the movements of single blades are eliminated. At the same time the high-speed arrangement gives a more positive drive than has ever before been secured with such apparatus.

It is rather surprising, however, to learn that despite the excellence of the theory the makers of the "Torbinia" car, in which this device is used, have found it necessary to provide a low gear of the ordinary sliding type. They found that at low speeds the friction of the blades, moving through the liquid with a very flat angle, absorbed so much power in proportion to the disturbance they set up that it was impossible for a car to pull out on a hill from a standing start.



Drum, and Paddles with Operating Mechanism, of Torbinia




Genillon Wheel, Rigid, but Flexibly Suspended from Hub

## Genillon Spring-Suspended Wheel

This wheel, which is described in the French journal *Omnia*, issue of January 22, is distinctly not a spring wheel in the usual sense of the term. The wheel itself is perfectly rigid, or the usual construction, and is provided with a solid rubber tire. The flexibility and elasticity is all in the attachment of the wheel to the hub. As may be seen best from the drawings, it is in reality suspended, the hub being several inches below the center of the wheel. The load is carried by a pair of stout coil springs, acting in compression. This construction is particularly adapted to live-axle systems in which the weight is carried by a solid axle entirely separate from the driving mechanism, such as that of the De Dion cars.

M. André Walter explains the merits of the wheel as follows: "Every time a wheel meets an obstacle it undergoes a reaction, directed toward its center, which may be divided into horizontal and vertical components. With ordinary suspensions the vertical component alone results in a movement of the wheel, which surmounts the obstacle without slowing perceptibly its horizontal motion. This horizontal reaction is transmitted to the chassis, which by its weight immediately overcomes it. In reality, this horizontal component, the effects of which are not noticed by the passengers of the car unless the height of the obstacle is several inches, nevertheless has a very destructive effect on the wheel and its tire.

"With the Genillon wheel things are quite different. When the wheel meets an obstacle it checks its speed slightly, although the body of the car, by virtue of its inertia, continues at the same speed. This relative movement between the wheel and its hub, which continues with the body of the car, compresses the spring mountings, and when sufficient force is exerted, causes the wheel to leap quickly over the obstacle, coming down, not behind, but ahead of the hub. On account of the increased distance between the center of the wheel and the hub, the body of the car has a very slight vertical movement; its inertia carries it on in practically a straight line, irrespective of the movements of the wheel.

"There is one difficulty, however, when the wheel, meeting an obstacle, slows down with respect to the chassis, its speed of rotation must diminish quite noticeably for some moments, again becoming normal after having made up for lost time by a temporary acceleration. In the case of a front wheel, this makes little difference; but in the case of a driving wheel, the wheel must either slip or the motor and transmission system must follow the variations of speed, multiplied as they are by the gearing. In practice the wheel would probably slip, and the damaging effect of such action on the tires would compensate for any saving that might otherwise be secured. It is to be hoped that the inventor has foreseen this difficulty and provided against it by some means as ingenious as the very clever arrangement of the spring wheel itself. This arrangement should find favor for truck use."

## Criticises T. K.'s Airship Scheme

Editor THE AUTOMOBILE:

[2,183]—In your issue of Jan. 20, containing letter number 2,143, T. K. Pittsburgh submits some ideas relative to aerial navigation worthy of study and investigation. In his over confidence, T. K. has taken for granted certain desired results, without reckoning the serious points of opposition. First, his idea of utilizing the combined effect of a horizontal rimbound propeller with adjustable blades for the purpose of raising and balancing the machine is well taken. The gyroscopic effect for balancing has been fully demonstrated in the monorail car. A single horizontal propeller of the diameter indicated in the sketch can never become practical—the great velocity required to lift the machine would cause the same to fly to pieces or twist loose from the hub. Another trouble would be the strong tendency of the large wheel to carry the entire machine around with its own revolutions (a case of the tail wagging the dog). He makes no provision for distributing the frame and forward propeller to equalize the weight to be carried. In my opinion, the forward horizontal and vertical planes should be larger and occupy a place in the rear, and should be operated as a rudder. To obviate the tendency of the machine to revolve with the overhead wheel, two or three smaller wheels, running in opposite directions, would no doubt eliminate the trouble. To obtain a sufficient thrust to lift the device and retain a safe balancing effect, great velocity is necessary. In the absence of large horizontal planes, the lifting propellers would necessarily need to be constructed slightly conical with spaces between the blades closed to get the effect of a parachute in making a descent. The details of T. K.'s sketch are vague and many points are entirely absent. Yet, after all, there is an idea implied that can be worked out for future navigators of the air to rise from the earth perpendicularly and also to be able to stop the machine in midair and retain their position long enough to exchange messages with each other. J. U. BAKER.

Stoutsville, O.

Some of the points are well taken, thus, the matter of rotary speed of the propeller as compared to the bursting speed of the rim. The latter may not attain a lineal speed of more than 6,000 ft. per minute, if of cast iron, and about 10,000 ft. per minute, if of steel. At the comparative size of the man and some other sizes which might be assumed with safety, the flywheel-gyroscope-lifting propeller appeared to be about 60 ft. in diameter, which would give it a circumference of 188.5 ft. Dividing the permissible speed by this, the speed of rotation which the material will allow is but 32 revolutions per minute for iron and 53 for steel. It is conceivable that this speed might possibly be of use somewhere at some time, by somebody, but for flying purposes it is out of the question.

As to the location of the forward propellers, either front or rear is recognized as good practice, the one used being simply dependent upon correct balancing, and changeable at will.

---

## The Motor Jumps and Misses

Editor THE AUTOMOBILE:

[2,184]—Will you please tell me the cause of a puzzling case of missing in my engine. It is a four-cylinder, 15-horsepower motor, and knocks or pounds on all four cylinders when I advance the gas lever to the second notch. But, when I advance it further between the second and fifth notch, it skips, and the motor jumps. Then, to advance it still further than the fifth causes it to settle down to knocking on all four cylinders again. In this latter case, it is going at a speed that is dangerous for such a light weight car. J. T. C.

Bayonne, N. J.

The pounding might be caused by too rich a mixture, which after being fed to the cylinders for some length of time, would also result in missing, through the interior of the cylinders becoming coated with a deposit of carbon. The symptoms of further pounding with an advance beyond that which causes the greatest missing, is very hard to diagnose, but the first-mentioned trouble might well be caused by too rich a fuel supply as stated. To remedy this, loosen up on the spring of the auxiliary air valve. This will allow air to enter sooner, and at high speeds and in hard going, the engine will draw in a greater percentage of air. If after this change is made, the engine still keeps up the pounding and missing, it will be necessary to attend to the adjustment of the needle valve, so that less fuel may enter.

# LETTERS INTERESTING

## Cylinder Carburetion Troubles

Editor THE AUTOMOBILE:

[2,185]—Will you please answer the following questions? 1. Why is it that a carbureter which will work with an engine of one or two cylinders of say 5-in. bore will not work satisfactorily with an engine of three, four, or six cylinders of the same bore. The same carbureter will work with three and four cylinders of 4 3-4-in. bore and with six-cylinder engines of 4 1-4-in. bore. 2. Will the same carbureter work with both two and four-cycle engines of equal bore and stroke, provided a check valve is used for the two-cycle? ROY WOOD.

Toronto.

Carbureters can only be changed from one engine to another when the cubical capacity of the two engines are alike. The statement that a carbureter would work equally well on motors of three and four cylinders 4 3-4-in. bore, and six cylinders of 4 1-4-in. bore, is ridiculous. The cubical capacity of a four of 4 3-4-in. bore and, say, 5-in. stroke, is 354.4 cubic inches. For a six of 4 1-4-in. bore and 5-in. stroke the capacity is 425.7 cubic inches, an increase of over 20 per cent. Surely if the carbureter was right in the one case, it would be much too small in the other, and inversely if it was large enough for the six, it certainly would be too large for the four.

Actually what must be done is to equate the cubical capacity of the cylinders of the motors in question, as the same vaporizer should be able to supply the same amount of gas to two engines of similar capacity, being otherwise different in number of cylinders making no difference. Thus, if the carbureter was right for a four-cylinder engine of 4 3-4-in. bore and 5-in. stroke, it could be used on the following engines of differing cylinders, but of the same capacity, all fours: 3 3-4 bore by 8-in. stroke; 3 7-8 bore by 7 1-2 stroke; 4 bore by 7 stroke; 4 1-4 bore by 6 1-4 stroke; 4 1-2 by 5 3-8; 4 5-8 by 5 1-4; 4 7-8 by 4 3-4; 5 by 4 1-2; 5 1-8 by 4 1-4; 5 3-8 by 3 7-8; and 5 1-2 by 3 3-4.

---

## Four-Cylinder Engine Power

Editor THE AUTOMOBILE:

[2,186]—Will you please tell me in your columns of "Letters Interesting, Answered and Discussed," how a certain company can get 50-horsepower out of a four-cylinder engine operated with an overhead camshaft and valves inclined at 45 degrees, set in opposite sides of the cylinder heads. Same engine having a 4 3-4-in. bore and 4 3-4-in. stroke, when an engine of such dimensions is rated at 36.4 horsepower? E. G. H.

St. Cloud, Minn.

In the matter of rating, any maker is free to rate his engine as he pleases. Thus, if a manufacturer so desired, he could rate an engine of this size (four cylinders, 4 3-4 by 4 3-4) at 100 horsepower. However, the formula rating method is meeting with much favor, and makers generally are finding out that it pays to rate according to formula. Then, if their engine through superior construction gives much higher power than the formula rating, the buyer is that much ahead, and is correspondingly better satisfied. Every satisfied purchaser becomes a good advertiser, so in the long run the maker giving the most for the money (which is what low or even formula rating amounts to) is the most successful.

As to the particular construction of which mention is made, it is generally admitted that overhead valves will result in superior power from a given size of cylinders, the rest of the construction being up to a fitting standard.

# ANSWERED AND DISCUSSED

## Adjustment of Air Valves

Editor THE AUTOMOBILE:

[2,187]—I am a subscriber to your valued journal and have gained knowledge far in advance of the subscription price from reading it, especially "Letters Interesting, Answered and Discussed," of which I would be glad to see more. I have had a little problem of my own, which I will ask you to help me out on. I have a Buick Model 10 (1909) on which is used a Schebler carbureter. A little while back the air valve worked loose and the stem and spring dropped down into the pan underneath the motor. In replacing this stem and spring, I am not sure whether I got it back as it was before, that is, the adjustment to give the best results. If possible, please tell me how to go about it to test or correct the setting of this valve. My car is equipped with a four-cylinder 3 3-4 by 3 3-4 motor, ignition is by storage battery for starting and magneto for running. I also notice sometimes that the radiator gets excessively hot and that steam will pass out through the overflow at the bottom, although the radiator has plenty of water. Please advise what causes such a high degree of heat. F. L. TORBERT.

La Fayette, Ala.

Air valves on carbureters should be adjusted to the high speed of the engine, the needle valve to the low speed. Having the latter set to your satisfaction, open the air valve wider and wider until the engine seems to lose speed. Mark this spot so that you can return to it readily, then turn the other way, closing down on the amount of air until your engine again begins to slow down. You will then have two marked points between which the engine runs well, but do not know the exact spot which will give the best all-around results. This will be a subject for further experimentation, and your best plan will be to take an arbitrary setting and try it out both as to speed on the level and pulling qualities, on hills and in heavy going, such as sand or mud. If you find this unsatisfactory under any or all of these conditions, make another trial. Note whether you decrease or increase the air, and if this improves the general average of the motor performance, go a little further in the same direction. If it does not improve it, but, on the contrary, makes it poorer, turn in the reverse direction. All other things being equal, as much air as possible is preferable, for this results not only in more power, but in an increased economy of running, provided the speed range be within that for which the valve is set.

## An Old, Old Friend Turns Up

Editor THE AUTOMOBILE:

[2,188]—Will you kindly answer the following question in your columns "Letters Interesting, Answered and Discussed," if space permits? A discussion started here a few days ago as to which wheels of a car, the inside or the outside, would leave the ground in case a car takes a turn at a high enough speed. At first thought it would seem as if the outside wheels would be the ones, but on reasoning it out, it is seen that theoretically it should be the inside wheels that would leave. On the other hand, I think there is a picture of a Chalmers car taking a turn in the last Vanderbilt Cup Race, and the outside wheels are up in the air. Can you tell me if there is any condition under which the outside wheels would leave the ground, and also explain the picture if you know of it?

Swarthmore, Pa. F. W. SEAMAN.

The inside wheels must always rise, and the picture to which reference is made (shown on page 777 of THE AUTOMOBILE for November 4, 1909) shows this very clearly, and not, as suggested, the outer wheels rising from the ground. In this picture, the car is coming around from the far right, the left part of the picture showing the banking of the track at this point.

## All About Piston Rings

Editor THE AUTOMOBILE:

[2,189]—What is the best way to remove piston rings from pistons? Is there much danger of breaking them in removing? What is the best way to "set out" the rings? How tight should they fit in the cylinder, when the bore is 3 5-8 in., stroke 3 1-2 in., air cooled? What is the best compression for four-cylinder motors of this size? I have set out large steam piston rings with pean hammer, but motor piston rings are so small, and being of cast iron, I have thought that they might be easily broken by this method. AMATEUR.

North Adams, Mass.

In removing piston rings, lay down on the surface of the piston three or four strips of very thin flat steel. Raise the first ring out of its groove, either by expanding it by means of special tongs or by simply picking it up as best you can. Then slide the flat strips of steel under this and slide the ring along on the strips until the top is reached, when it may be picked off. The reason for the strips of steel is, first, to allow the rings to slide easily, having a uniform surface to slide on, and, second, to prevent the second and later rings from dropping into the open grooves made by the first ring. It is not always convenient to take the bottom ring off first, and even if it were done there would be the other rings to pass over, which is just as difficult as passing over an open ring space.

Cast-iron piston rings may be set out by means of a pean hammer, just as was formerly done with steel steam rings. The only thing is that the work must be done more slowly and more carefully. There are machines on the market in which the rings are turned concentric, and then made elastic enough to spring out and hold against the cylinder walls by hand-peaning on one side of the ring. The number of examples of this are few in America, but a number of French car makers use it.

The tightness is hardly dependent upon the engine size, although the clearance allowed between the piston and walls is usually proportioned to size, a matter of expansion allowance.

## Types of Rear Springs

Editor THE AUTOMOBILE:

[2,190]—Will you please advise me through your columns how many automobile manufacturers have adopted the reverse rear spring? Do you not think that in time this spring will be universally adopted, as its easy riding qualities are certainly more pronounced than any other type of spring? E. G.

Montreal.

The form of spring to which the writer above doubtless has reference is that usually known as the platform spring. The reason why this is taken as the one to which reference is had is that but one rear spring is referred to, which is the case in the platform spring, the cross spring being the reverse of that usually used, that is, what is called the opening of the spring is downward, not upward.

Some idea of the number of makers using this type of spring in preference to all others for the rear of the chassis (it is never used elsewhere) may be gleaned from a table of specifications. From such a one which is handy the following figures are taken: 123 makers, with 255 different car models, used 32 platform springs. As to cars, this is just 12.5 per cent., while as to makers, it is 26 per cent. The latter figure is, however, somewhat unfair, for many of the makers used this kind on one model and not on others, so that the real percentage of makers committed to this type as the *only* one would be much less than this; in fact, much closer to the other percentage figure. From this statement, as well as the percentages, the idea may be gathered that no one type of spring can be said with truth to be superior to all others. To state this as a fact, besides lacking proof, would be to insult the intelligence of the makers using other kinds, and using them for good and sufficient reason, too.

From the same table it really would appear as if the three-quarter scroll-ended elliptic spring is held in the highest esteem just now, although this is rather a late improvement, coming into vogue as it did about two years ago.

# SOME COIL TROUBLES EXPLAINED

By Stillman Taylor

ALTHOUGH the autoist may at first have some little difficulty in diagnosing troubles which not infrequently result in the spark coil failure, these puzzling matters will soon be understood as one becomes acquainted with the electrical plant and familiar with the idiosyncrasies of the sparking circuit. Coil troubles are, as a general thing, caused by short circuits, and, while the source of the failure may be due to a defect or breakdown in the coil itself, the difficulty is more likely to be caused by poorly insulated wiring, loose terminals, or some other part of the electrical system outside of the coil proper. In fact, there are a number of probable causes which are certain to affect the proper action of the coil, as may be noted from the following list of symptoms and their causes:

**Symptoms:**—Irregular or intermittent buzzing of the contact breaker or vibrator, metallic clatter or "tinny" sound of vibrator, as distinguished from the usual moderately high-pitched musical buzz. Buzzing sound coming from inside the coil.

**Causes:**—Pitted or badly worn platinum contacts, loose contact studs, trembler blade adjusted too loose or too stiff, thus affording poor contact, contacts made of inferior platinum alloy, loose terminals, dirt on terminals or coil plates, moisture on plates, defective insulation in connecting wires, defective condenser, coil punctured (insulation broken down inside).

The most prolific cause of failure is due to pitted and improperly adjusted trembler contacts, and in cases of misfiring, evidently due to some failure of the ignition system, the contact breaker of the coil is the first point to be examined. If the contacts are pitted and uneven they should be carefully trimmed up level with a "dead smooth" jeweler's or manicurist's file. In adjusting the tension of the trembler blade, avoid a loose or too stiff tension, as the former will provide a slow contact, and the latter will interfere with the proper action of the coil, and likewise rapidly pit and wear away the platinum. Good coil service cannot be had unless the tremblers of all the units are adjusted as nearly alike as possible. This matter is not always given the attention it deserves, and while an "old hand" may be able to approximate this adjustment very closely by ear, the only exact method is to measure the current consumption of the coil by the aid of a special ammeter sold for this purpose. The manufacturer's directions should be explicitly followed, and each trembler adjusted to draw the recommended amount of current.

The accumulation of moisture or dirt on the terminals of the coil is frequently the cause of short circuits, and a short circuit may also be produced by a weak place in the insulated covering of the wires. Although not always the case, a short in the coil may often be located by excessive sparking at the contacts and in some instances the short will set up a buzzing inside the coil. Excessive sparking may be caused by poor adjustment of the trembler blades, inferior platinum, and less frequently traced to a defective condenser. Proper adjustment will prove a remedy in the first case, new platinum points in the second, while a new condenser or coil will be needed if the fault is in the coil itself.

In the event that the motor develops a case of misfiring, the autoist should first ascertain if all the vibrators are breaking the circuit properly on time. This may be quickly done by turning over the motor until it makes contact with the segment of the timer. If no buzz is forthcoming, examine the wiring and terminals. If the buzz is heard, locate the missing sylinder by cutting out each one until the "dead" cylinder is found. This may be located by the lower temperature, if the motor has been running for some time, or by inserting a bit of pasteboard between the points of all tremblers but the one to be tested. When located, the trouble will generally be found to be in the plug.

In case the primary winding of the coil is suspected to be injured, the defect may be easily located by connecting up the voltmeter to the battery terminals, and, after taking a reading, place one end of the instrument in contact with the terminal of the coil. This simple test will point out any defect in the primary winding, as the current must go through the primary winding before it registers the voltage, through the voltmeter. Short circuits in the winding of the coil are naturally more likely to occur in the high-tension of the secondary wiring, but as this winding is of considerable length, the exact location of the leak can only be determined in the testing room of the manufacturer.

Failure of the condenser is not a common trouble, yet the writer has upon several occasions traced excessive sparking at the points to a grounded condenser. As the autoist may know, the condenser is connected in a shunt in the primary circuit, and if the connections are faulty the condenser may become grounded by reason of the wiring coming into contact with another wire or other conducting body. The trouble may be in either the wire leading from condenser to trembler on one side, or in the connecting wire joining trembler and condenser, or from condenser to ground, on the other side. In cases of this kind, the current cannot reach the condenser, whose function is to absorb the spark, and it accordingly passes by way of the leak or short, thus causing excessive sparking at the tremblers. As the condenser connections are made with very light wires, and as this part of the coil is apt to look very complicated to the average driver, it is best to send the condenser to the makers, in case it has broken down through internal sparking.

# Some Common Tire Fallacies Exploded*

ERRONEOUS would be the best word to characterize the common notion of the first point to be raised in connection with the pneumatic tire and the manner in which an automobile is carried by it. The ordinary view of this seems to be that the wheel rests on and is supported by the cushion of air below it—the air, in fact, compressed between the lower portion of the rim and the tread of the tire adjacent to the ground. The objection to this simple view, when one comes to consider it, is that the rim of the wheel is completely surrounded by the air enclosed within the tire. The compressed air not only presses on the under side of the rim, forcing it up, but also on the upper side of the rim, forcing it down; and as the air chamber within the tire is continuous the two pressures are equal. Similarly, the air pressure on the anterior face of the rim forcing it back is equal to that on the posterior face of the rim forcing it forward. Every square inch of the rim is exposed

* Short abstract of paper read before the Royal Automobile Club of Great Britain and Ireland, by D. W. Samways, M.D., D.Sc., M.A.

to an equal number of pounds of air pressure acting perpendicularly to its surface, while the pressure on any square inch is always opposed and balanced by that on the square inch of the bed of the rim diametrically opposite to it. It is manifest, therefore, that the wheel and rim cannot be supported by the pressure of air on the rim.

To illustrate this point, the following experiment was performed: The tire of one wheel of a car weighing with its load 600 lbs. was pumped up to a pressure of 70 lbs. per sq. in, the wheel having previously been jacked up, with the air valve placed in its lowest possible position. The wheel was then turned half round, so that the valve communicated with the air chamber above the wheel. The pressure was still 70 lbs., exactly as before. The wheel was then lowered, and the tire, with its load, rested on the ground. The pressure taken with the valve inferiority was now nearly 72 lbs., a rise of less than 2 lbs. per sq. in., when the air instead of the jack had to carry the load. The same pressure of 72 lbs. was recorded when the wheel was turned half round and the record was that of the pressure in the air chamber above the wheel. The increased pressure of 2 lbs. per sq. in. on the rim beneath the wheel pressing upwards could not possibly carry the wheel, and, moreover, was rendered neutral as a lifting force because the same increase of pressure occurred above the wheel, acting equally as a depressing force upon the rim beneath it.

Of other forces acting on the rim and wheel, there remain only the tensions of the tire walls, whose free borders are fixed under the beading of the rim. The tire is exerting an immense centrifugal pull on the rim. It is trying to burst away into space, and is only held back by its walls, which are anchored to the wheel. On a wheel 870 by 90 every linear inch of the tire wall fastened under the beading of the rim, when the tire is inflated to 70 lbs. pressure, is dragging centrifugally outwards with a force exceeding 100 lbs. When, however, the wheel and tire are jacked up, this pull is equal all round, and there is consequently no reason for the wheel to show any preference to the pull in any direction. If, however, the wheel and tire be rested on the ground, the centrifugal pull of the portion of tire resting on the ground is taken off the rim. The pressure on the tread touching the ground is transferred to the ground and supported by it, instead of as before by the adjacent tire walls which attach the tread to the rim and previously dragged downward on the rim. The effect, therefore, of the ground in carrying a pneumatic tire and its load is to slightly increase the pressure and consequent tensions in the tire, and to relieve more or less completely the vertical component of the tension in the tire walls immediately above the ground. Above the wheel the tire walls continue to pull upwards on the rim with undiminished and now unbalanced force; consequently they pull up the rim, and with it the wheel and car, whose total weight exactly equals the amount of downward tension taken off from the tire walls below the wheel. A motor wheel is, therefore, in all cases suspended from above by its inflated tire. The tire is supported on the ground below it, but the wheel is hung from the portion above it, and is not carried by the cushion of air from below.

If the wheel be hung from the tire arch above it, the next point is to consider what supports this arch. Now we have been told that the air pressure outwards on the whole tread of the tire is exactly equal to the air pressure inwards on the rim of the wheel, and that these balance one another. This obviously is not the case. The tread of the tire is part of a larger circle than the rim of the wheel, and consequently has a larger surface exposed to the pressure of the air within the tire. Thus on a wheel 870 by 90 the rim measures 3 ins. across, and about 88 ins. round. The whole rim has, therfiefore, a surface area of 264 sq. ins. The tire tread measured, not at its margin, but where it also is about 3 ins. across, is about 100 ins. in length, and has consequently a horizontally resolved surface area of about 300 sq. ins., *i. e.*, 36 sq. ins. more than the whole area of the bed of the rim. If the tire be pumped to a pressure of 70 lbs. per sq in, the tread will have to support a centrifugal air pressure of 36 by 70 = 2,520 lbs. more than the centripetal air pressure which the bed of the rim is called upon to support. Of this total excess pressure of 2,520 lbs. on the tread over that on the rim, one-half, *i. e.*, 1,260 lbs., is exerted on the tread above the wheel and the other half on the tread below the wheel.

Now, the air in the upper half of the tire communicates with the air in the lower half across the two sections of tire which unite them, one before and one behind the wheel. These sections have a transverse area of about 9 ins. each, and, therefore, transmit air columns of that section, every square inch of which columns exerts a pressure of 70 lbs. That is, each air column presses upward and downward with a force of 9 by 70=630 lbs. The two columns transmit, therefore, a force or pressure of 1,260 lbs. This coincides with the amount by which we found the pressure on the upper half or vault of the tire tread exceeded the pressure on the half rim of the wheel. In this pressure scheme the wheel itself is but a frame around which the tire is bound. The wheel receives an upthrust $x$ from the air below it, and supports a down thrust $x$ from the air above it, which in turn exerts an upthrust on the vault of the tire of the same amount $x$. The vault, in addition, receives from the two columns of air spoken of a total upthrust of 1,260 lbs., which is quite sufficient to more than carry the wheel and its load.

These remarks will explain the phenomenon so frequently observed of a tire bursting in its upper half. The foreman of one of the largest Paris garages, which always contains scores, and sometimes a hundred or more cars, told that in the garage tires burst almost always in the upper half. "I speak," said he, "not of ten, but of a thousand cases." The part of a tire least subjected to strain is that between the wheel and ground.

The second question to which attention is called relates to the advantages of a high tire over a low one, especially as regards its dust-raising properties. The Royal Automobile Club is constantly endeavoring to discover in what direction we must look to mitigate the dust nuisance, and the belief is that the encouragement of higher driving-wheels would be one step in the true direction. The tire round a wheel has to support the weight of the wheel and its load, and to do so, with a given pressure in the tire, a definite area of the tire tread must be in contact with the ground. If the length of the contact surface be short, as it necessarily must be with a small wheel, the width of contact must be increased. Hence, it has been found that the small wheels at present used, especially for driving wheels, must have very wide tires. Now, it is the width of contact, and not the length of the contact surface on the ground, which determines the amount of dust a wheel raises. A wide track obviously raises more dust than a narrow one. When the wheel is high, as in some of the cars originally made, the driving wheels can easily take tires as narrow as those on the front wheels. With a high wheel the contact surface is a long narrow oval, and with a low one it is a short wide oval for the same supporting area. One comparatively light car requires tires 810 by 100 on its driving wheels; otherwise they perpetually give trouble, especially through overheating. On a much heavier car exposed to much rougher usage, are tires of 1910 by 90, and though the width of the tires is less than in the lighter car, it behaves almost as if it were over-tired. At the same time it raises much less dust at the same speed, making, as it does, a narrower track. They run much more smoothly; the tire lasts longer, as it touches the ground less often; it probably heats less and certainly cools more freely.

The third problem relative to tires, one affecting us all, is how to prolong their life. The first essential is to have as high wheels as possible on our cars. Experience shows that the life of a tire, other things being equal, goes largely with the height of the wheel, for reasons some of which have been suggested. Tires on large wheels, moreover, support better the application of the brake than those on small ones, for the friction with the ground is along the long axis of the oval surface of contact, and a longer stretch of tire wall supports the strain.

# SOME TRANSMISSION MECHANISMS

In

## Modern Shaft-Driven Automobiles

By Forrest R. Jones, M. E.

IN modern shaft-driven gasoline automobiles, to which type the great majority of cars now belong, the tendency is to locate the transmission either at the rear axle as an integral part of the differential housing, or as a rigid extension of the crankcase of the motor, and to use only one universal joint or coupling between the motor and rear axle in connection with this arrangement of the transmission mechanisms.

The advantages and disadvantages of these two locations of the change-speed gears are decidedly marked in each case. The use of only one universal joint, as compared with the common earlier practice of using a pair of universal joints in proper relation to each other, is also an important feature, with its own advantages and disadvantages. In both cases the reduction in the number of parts, especially wearing parts, is an important item that should never be omitted in considering such a machine as an automobile, in which lightness and simplicity are of paramount importance, and in which wear is extremely rapid. The rapid wear is due to the lightness or smallness of the parts and the consequent high pressures and speeds to which they are subjected, aside from the dust and grit which reach parts unprotected from them. The absence of dust and grit protectors is not unusual in the less expensive cars. The wear due to dust and grit is notably rapid in automobiles as compared with other classes of transportation machinery. This rapidity of wear is because the automobile travels over roads which are generally dusty or muddy, and the road wheels move so rapidly that gritty substances are constantly stirred up and either drawn or splashed over the running gear, particularly the transmission mechanism, when it is not suitably protected.

### When Two Universal Joints Are Used

When two universal joints are used in a shaft transmission, one joint near the rear axle and the other near the change-gear case, the shaft which carries the bevel pinion gear that meshes with the larger gear on the rear axle is necessarily short. This short pinion shaft of course requires the two bearings which support it is to be near together. When the two bearings, both on the same side of the pinion gear, are near together, the pressure on them is much greater than when they are at a considerable distance apart. This can be seen by the aid of Figs. 1, 2 and 3.

Fig. 1 shows a shaft A, to which a load, or side pressure, of 100 pounds is applied near one end at B. The shaft is supported at C and D. The distance between B and C is 2 inches, measured parallel to the length of the shaft; that between C and D is 4 inches, measured in the same manner. The shaft may be considered as a lever, with the fulcrum at C. The pressure, or force, at D, on the longer arm of the lever, bears a ratio to the force at B equal to the inverse ratio of the lengths of the lever arms, which lengths are 2 inches and 4 inches. This is the value of the force that is necessary to hold the shaft in place. The

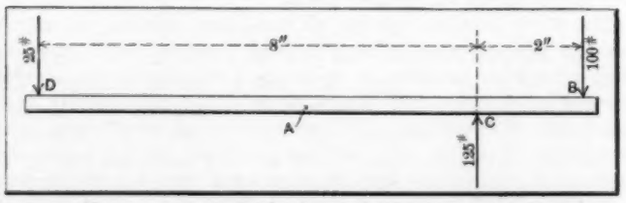



Fig. 1—Shaft with side pressure applied nearer to one end

force at D is therefore $\frac{2}{4}$ of that at B. Its numerical value is $\frac{2}{4} \times 100 = 50$ pounds. The force, or pressure, at C is the sum of those at B and D, and its numerical value is $100 + 50 = 150$ pounds.

By increasing the length of the longer lever arm of the shaft to 8 inches, as in Fig. 2, the pressure at D is decreased in the same proportion. It becomes equal to $\frac{2}{8} \times 100 = 25$ pounds; and the pressure at C is decreased by the same number of pounds as that at D. The numerical value of the pressure at C, Fig. 2, is $100 + 25 = 125$ pounds.

In Fig. 3 the longer lever arm is 40 inches in length. It is ten times as long as in Fig. 1. The pressure at the end of the longer arm is thus reduced to $\frac{2}{40} \times 100 = 5$ pounds; and the pressure at C is reduced to $100 + 5 = 105$ pounds.

The longer lever arm of 40 inches in Fig. 3 gives a pressure at the fulcrum C that is 30 per cent. less than that at the corresponding point in Fig. 1. Or, expressed in reverse order, the pressure at C in Fig. 1 for the short shaft, is more than 42 per cent. greater than that at C in Fig. 3 for the longest shaft. The pressure at D near the end of the shaft is ten times as great for the short shaft as for the long one.

The side pressures on the bearings of the pinion-gear shaft are affected in exactly the manner just given by changing the distance between the bearings which support the shaft when both of the two bearings are on the same side of the pinion. It is quite common, although not the universal practice, to place both bearings in front of the pinion bevel gear which drives the bevel gear on the rear axle, or on the differential case.

### Lack of Alignment Worse Than Wear on Bearings

Even if the wear on the bearings of the short pinion shaft is exactly the same in amount as on those of a longer shaft with a greater distance between bearings, the short shaft is thrown out of proper alignment to a greater extent than the long one. This throwing out of alignment destroys proper meshing, or engagement, between the pinion and its mating bevel gear. The teeth of the pinion and gear are thus caused to bear against each other at and near only one end. Noisy running and rapid wear of the gear teeth are the result. It is extremely important that the bevel gears be kept in proper position relative to each other. Displacement from these proper positions has a far greater action to injure and destroy them than in the case of plain spur gears designed to run on shafts parallel to each other.

There are therefore two strong reasons against using a very short shaft for carrying the pinion gear that drives the large bevel gear mounted on the differential of the rear axle. These are, as just stated, the high pressure and consequent great wear that are brought on the bearings on account of the necessity of placing them near together on the short shaft, and the greater amount of displacement of the pinion gear from its proper position to mesh with its mate allowed by the shorter shaft, even

when the amount of wear at the bearings is the same for both the short and the long shafts.

It certainly is well worth while to adopt a design which gives a low pressure on the bearings, provided such a design does not bring in other features that are more objectionable than heavy bearing pressures and improper meshing of the bevel gears.

### Small Angle Reduces Rotary Irregularity

What may at first seem a very serious objection to the use of only one universal joint in the transmission system, as compared with the use of two such joints, is the uneven, or jerky, action of a single joint in transmitting rotation when the two shafts which it connects are not in line with each other, which is the usual condition. But the considerable length of propeller shaft between the rear axle and a universal joint located well forward toward the motor makes it possible to keep the angle between the propeller shaft and the one which drives it comparatively small, thus reducing to a minimum the irregularity of relative rotation of the two shafts thus connected. Aside from this it is desirable to keep the angle between the two shafts small in order to keep down wear in the joint itself. In fact, in well designed cars with only one universal joint, wear in the joint generally needs more consideration than the jerky motion of the driven shaft due to the action of the universal joint. This wear, as well as the irregularity of rotation, is greater whan the angle between the shafts is large than when it is small.

The long propeller shaft, if of as small a diameter as is allowable with high-grade steel, is elastic enough torsionally to yield by twisting slightly when the rotative effort acting upon it is momentarily increased by the irregular rotative action of the universal joint. This giving, or elastic yielding, of the propeller shaft prevents injuriously heavy stresses in the gears at the rear axle, as well as in all of the other parts of the transmission mechanism.

If the crankshaft of the motor rotates at a uniform speed, the propeller-shaft is driven at a higher speed of rotation than that of the crankshaft twice during each revolution of the propeller shaft, on account of the uneven action of the universal joint. It is during the periods in which the rotative speed of the propeller is increasing relative to that of the crankshaft that the strain comes on the transmission mechanism. The speed of the propeller shaft also drops behind that of the crankshaft twice during each revolution in order to compensate for the more rapid temporary speed. In the statements of this paragraph it is assumed for simplicity that the direct connection is in use between the crankshaft and propeller shaft, so that the average speed of rotation of the two shafts are the same.

### Smallest Angle With Transmission on Rear Axle

When the change-speed gears are located just forward of the rear axle, the universal joint can be placed farther forward than when the change-speed gears are placed just in the rear of the motor and clutch. The universal joint can in fact be made a part of the clutch when the change-speed gears are just forward of the rear axle. The latter arrangement is therefore the one by which the angle at the universal coupling between the motor and propeller shaft is the smallest that can be obtained by any arrangement using only one universal coupling. In this arrangement the shafts in the change-gear case are parallel to the propeller shaft and are therefore inclined upward toward the front of the car.

If the propeller shaft makes direct connection with the pinion-gear shaft for high speed of car travel, as is the more usual practice, then the center line, or axis, of the propeller shaft must intersect the axis of the rear axle when the usual conical bevel gears are used at the rear axle part of the transmission system. The length of the inclined propeller shaft is then, in effect so far as its inclination is concerned, from the clutch to the axis of the rear axle. This extreme length of course gives the minimum inclination to the propeller shaft for given relative positions of the motor and rear axle.

The pinion-gear shaft can be made long enough, when the change-speed gears are just forward of the rear axle, to allow a distance between the bearings of the pinion shaft sufficient to keep the bearing pressures comparatively low, unless the form of change-speed gears is such that the gear case is very short, as may be the case with selective gears.

It may at first seem that a smaller diameter of propeller shaft can be used when the change-speed gears are at the rear axle than when they are near the motor. This would be true if the clutch would never grip hard so as to suddenly check the speed of the motor when the clutch is put into engagement to start the car. If the gears are set at high speed and the clutch is engaged while the motor is running fast, sudden seizure of the clutch will cause the road wheels to spin. The torque and stress brought upon the propeller shaft by such an action are the same as if the change-speed gears were near the motor and set at slow speed. A corresponding action occurs when the motor is allowed to stop while the car is descending a hill and the clutch is then engaged to start the motor; the limit of the stress on the propeller shaft is then determined by the skidding of the wheels.

### One Disadvantage of Rear Location

A very serious disadvantage of the change-speed gears at the rear axle is the increased dead weight on the axle and wheels. This increase of dead weight varies from probably 50 per cent. to 100 per cent. or more of the dead weight on the rear wheels when the change-speed gears and their casing are carried on the frame of the chassis. Dead weight on the axle and wheels is far more injurious to the tires than the same amount of weight carried on springs. It is especially hard on the tires when both rear wheels strike an obstacle, or a gulley, at the same instant. Street crossings and railway tracks above the level of the road are not unusual, and gulleys are often found in country roads. It is a fixed rule in the older forms of transportation devices to keep dead weight off the axles as far as possible.

When the change-speed gears are located just in the rear of the motor, the distance between the universal joint and the rear axle is necessarily less than when the change-speed gears are at the rear axle. The angle at the universal joint is therefore grater when the change gears are located near the motor, which is a disadvantage. With planetary gears or a short gear case containing sliding gears of the selective type, the distance from the universal joint to the rear axle is not much less than when the change-speed gears are at the rear axle, however.

As a total, the advantages seem to lie in favor of the designs of transmission mechanisms in which short change-speed gears are located in the immediate rear of the motor.

It may also be noted that a motor with its cylinders cast en bloc and having a two-bearing crankshaft support is favorable to increasing the distance between the universal joint and the rear axle, and thus to reducing the angle at the universal joint, since such a motor is shorter than one with individual cylinders.

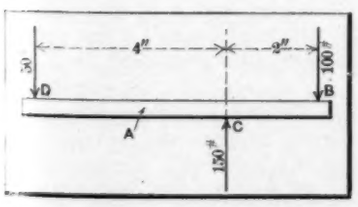



Fig. 2—Same with shorter arm

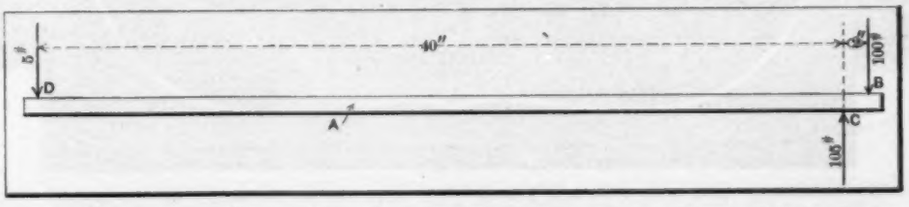



Fig. 3—Longer lever arm arrangement which reduces pressure at a given point

# Minneapolis Draws Crowds From Northwest

MINNEAPOLIS, MINN., Feb. 21—A bigger and better automobile show describes Minneapolis' third annual show, which began last Saturday at the National Guard Armory and will continue a week. Visitors from Minnesota, Wisconsin, North and South Dakota, Montana and Western Canada, have been in attendance. There are a greater number of exhibits than have ever been shown before, 110 makes of cars being displayed, which is 50 more than last year. There are upwards of 20 exhibits of automobiles at the show that have never been sold in this territory before this year.

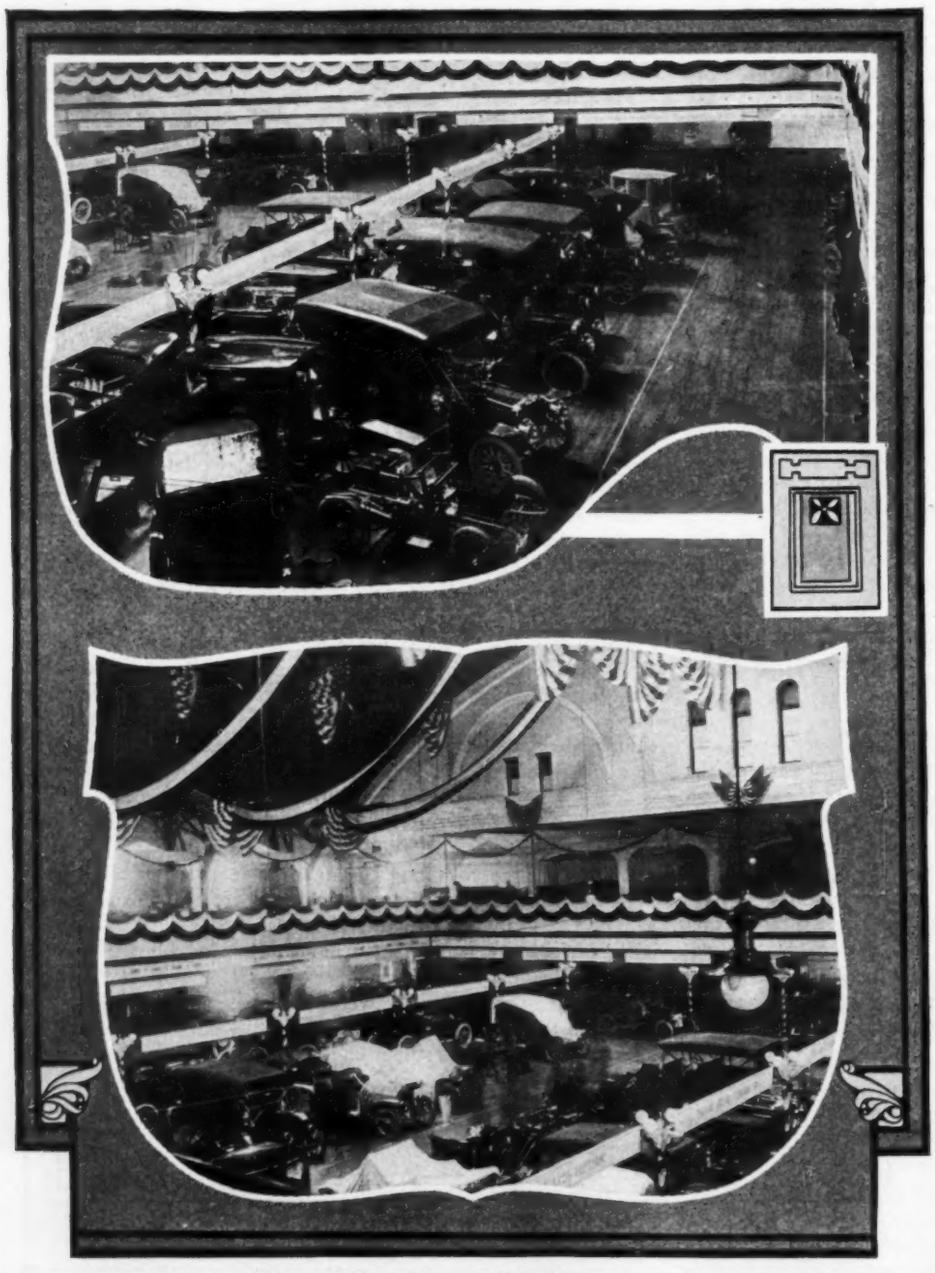
The lighting and decorative features are unusually elaborate. The main floor of the armory is ablaze with lights grouped in immense clusters on twelve posts and thousands of incandescent electric lights stud the ceiling and illumine every booth. Music is furnished afternoon and evening by the First Regiment band.

The liberal display of electric automobiles, commercial trucks and the overflow of pleasure cars are shown in the basement. Judging from the unusually large number of exhibitors, the management will be compelled to secure larger quarters for their show next year.

Walter R. Wilmot is manager of the show and the officers of the Minneapolis Automobile Association are Harry E. Pence of the Pence Auto Company, president; H. E. Wilcox of the H. E. Wilcox Motor Car Company, vice-president; F. E. Murphy, secretary and treasurer. Horace Lowry is president of the Minneapolis Automobile Club, and Reuben Warner of St. Paul is president of the State association.

The exhibitors and exhibits follow:

The Pence Auto Company has a unique exhibit of Buick, Oldsmobile and Oakland cars. It is also showing a collection of Buick trophies valued at $46,000. Louis Chevrolet, of the Buick team, accompanied the trophies to Minneapolis and is in attendance at the show. The Mich-Stair Company shows Overland and Knox 1910 models. The Knox four-passenger runabout and the Knox model R, with torpedo body, both fully equipped, are features of this display. The Knox tonneauette and the Knox six-cylinder, seven-passenger touring car are also being shown.



TOP—MINNEAPOLIS SHOW SEEN FROM THE GALLERY; WINTON IS PROMINENT
BOTTOM—LOFTY ROOF OF THE ARMORY, DRAPED WITH BUNTING AND FLAGS

The Columbus Buggy Company is exhibiting the Mora car, the Columbus electric in its various models and the Firestone Columbus touring car. The Northwestern Auto Company shows a Ford chassis, the engine of which is run by an electric motor. The Goosman & Johnson E-M-F. Company shows the E-M-F 30-horsepower roadster and the five-passenger E-M-F touring car. The Flanders "20" and a Speedwell touring car are also displayed.

The Deere & Webber Company shows a complete exhibit of the Velie "30," model D, 40-horsepower, model E roadster and model F top tonneau. The Northwestern Stearns Company is exhibiting a line of 1910 Stearns touring and roadster cars. The H. E. Wilcox Car Company show the 1910 models of the Wilcox pleasure cars. The Ramaley Auto Company, St. Paul, shows the 1910 models of the National cars.

The Great Northern Implement Company shows for the first time in Minneapolis the "Ohio" in its various models. The Whiting roadster, four-cylinder, 20-horsepower, with full equipment, is also on this stand. An attractive display, including the model 30 Limousine, is that of the Northwestern Cadillac Company. This concern's exhibit also includes a polished chassis with exposed engine. The Luverne Auto Company, Luverne, Minn., exhibits the Luverne "40," its leading model,

and a chassis. P. J. Downs & Company are exhibiting the new 1910 Rambler in three models.

The Tri-State Automobile Company, which recently took on the agency of the Paige-Detroit, has on display one or two models of this car and also the Inter-State four-cylinder car in three styles—baby tonneau, roadster and touring car. The Regal "30" 5-passenger touring car and also a chassis of the same make; the Pennsylvania model C, a six-cylinder chassis; model D, with toy tonneau are the cars which the Haynes Automobile Company has on view. In this booth also is shown the Pennsylvania sectional motor.

The Royal Auto Company has two booths, in which are exhibited the Royal Tourist four-cylinder, both in the limousine and touring car bodies, with chassis; the Glide four-cylinder, seven-passenger with the new 40-inch wheels, and also a chassis of this car with the mechanism of the engine exposed. Two booths are occupied by the Fawkes Auto Company, in which are exhibited three models of the Marmon with full equipment; a Matheson six-cylinder touring car and chassis; a Reo four-cylinder car and an American.

A striking exhibit has been put on by the Maxwell-Briscoe Company. The Hathaway-Stimpson Company has displays of the Hupmobile and the Detroit electric. Mr. Stimpson has made special arrangements to have shipped to have on view a four-passenger Detroit electric brougham done in pearl gray with pure white stripes and gray French whipcord upholstering. The W. H. McIntyre Company has on display model M-2, four-cylinder roadster; model M-4 four-cylinder touring car and a model A-1 runabout. Models of the Halladay are shown by the Heaney Automobile Company, the exhibit being one of the most complete in the entire show. In addition to nine Halladay models, a polished chassis and engine are displayed.

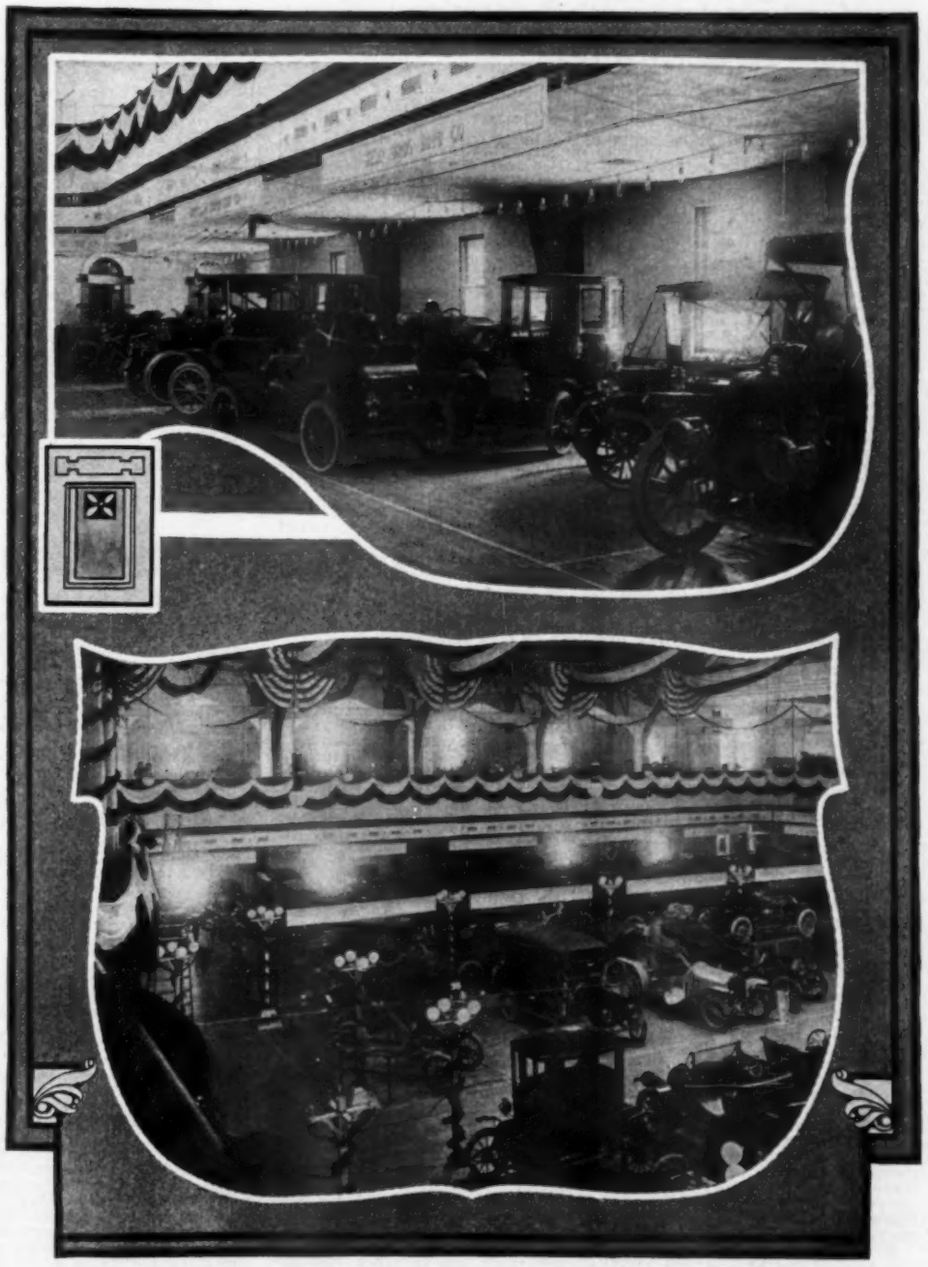
The Barclay Auto Company is displaying the Chalmers 30-horsepower touring car, also the Hudson in two models, the roadster and touring car. The Franklin and Baker electrics are featured by the Robertson Motor Company.

The MacArthur Zollars Company has in its array of cars new 1910 models of the Everett "30," the Corbin, the Anhut Six, the American Simplex, the Black-Crow and the Babcock electric. The Moore Carving Machine Company is showing four or five models of the Elmore, and another feature of this booth is the fine display of Woods electrics. Moore Brothers, Wimbledon, N. D., are showing three cars of their own make. The Pierce-Racine Company shows two models of the Pierce-Racine Model K, a close-coupled toy tonneau and a Pierce-Racine touring car. T. C. Peebles recently took the local agency.

A special exhibit of Peerless and Pope-Hartford cars shipped directly to Minneapolis from the Chicago show has been put on view by the T. M. Anderson Company. The Northland Motor Car Company is showing the Stoddard-Dayton model K, the toy tonneau F-A-L-Car and the Courier roadster.

Joy Brothers have on exhibition in various styles the Packard touring car and one of the new Packard commercial trucks. The Winton Six touring car, accompanied by a chassis and a toy tonneau, are in the booth reserved by the Winton Motor Carriage Company. The Electric Carriage & Battery Company is exhibiting several models of Rauch & Lang electrics. Handsome coupés, broughams and victorias are among those on view. A complete line of the renamed Maytag cars has been put on by the Maytag-Mason Company.

The White garage has three models of White cars on exhibition; two are steamers and one a White gasoline car. The Warren-Detroit Company is exhibiting the Warren-Detroit car in the booth with the Ranger Auto Company. The car is one of the recent makes to invade the Northwest. The Kemp Brothers Automobile Company is showing a complete line of Brush cars fresh from the factory. In its booth the Ranger Auto Company is showing the Auburn touring car.



TOP—KEMP BROTHERS AUTO CO.'S COMPLETE EXHIBIT OF BRUSH RUNABOUTS
BOTTOM—THE ARMORY WAS BRILLIANTLY LIGHTED BY CLUSTERED GLOBES

# A. A. A. RACING BOARD PUTS FORTH ITS BEST EFFORT

TRACK, hillclimbing, and long-distance racing rules, as issued by Chairman Butler of the A. A. A., to govern events during the year 1910 differ from the rules which previously obtained. This year stock cars are defined by a percentage system, whereas last year 25 automobiles of a given model were all that had to be designed and constructed in order to bring the model within the classification designated as "stock cars." In the new percentage system, a company which has an annual output of a given model of 50 cars or less, the Commitee must see 25 automobiles, but if the output is 10,000 the minimum number, from the Committee point of view, will have to be 450.

The piston displacement classification remains as before, with the exception that 100 pounds have been dropped from the weight of each class. The options permitted for the stripped stock chassis is but slightly altered, it being provided that bonnet straps must be added, and that part of the dash enclosing the rear of the bonnet, together with all its customary equipment, muts be retained. Drivers will have to obtain a certificate, and be registered with the Contest Board.

Amateurs are defined as those who are not actively engaged, either in the automobile industry directly, or in the accessory business. The new rules seem to be most carefully drawn, and evidently reflect the experience of the last year, and Chairman Butler seems to have taken into account the points of demerit, to the extent that they are eliminated. The following is a brief résumé of the principal amendments of the 1910 contest rules as adopted by the Contest Board, and approved by the Board of Directors of the American Automobile Association, and the Manufacturers' Contest Association at Chicago, February 10, 1910:

**Stock Car**—"A motor car, the complete description of which, upon the official blank provided for the purpose, has been filed with the main office of the Technical Committee of the Contest Board at least 30 days prior to the date of the contest entered, the quantity production of which bears to the total yearly production of its manufacturer the ratio set forth in the following table, and which is on sale through the regular selling representatives of the manufacturer."

Official blanks for stock car description may be obtained from the chairman of the Contest Board, 437 Fifth avenue, New York City.

Computation in connection wtih the following table shall be based upon a period of time from July 1 to June 30 the following year.

In computing the annual output of a manufacturer, no account shall be taken of his production of taxicabs, delivery wagons or other vehicles designed for commercial use.

At the discretion of the Contest Board any competitor may be required to file a bond of $5,000 that the entry made by him is a bona fide stock car within the meaning of this definition:

| Total Output. | Percentage. | | Number of Same Model. |
|---|---|---|---|
| 10,000 or more | 4.5% | equaling | 450 minimum |
| 8,000 to 9,999 | 5.0% | equaling | 400 minimum |
| 6,000 to 7,999 | 6.0% | equaling | 360 minimum |
| 4,000 to 5,999 | 7.0% | equaling | 280 minimum |
| 2,000 to 3,999 | 8.0% | equaling | 160 minimum |
| 1,000 to 1,999 | 9.0% | equaling | 90 minimum |
| 500 to 999 | 10.0% | equaling | 50 minimum |
| 250 to 499 | 16.0% | equaling | 40 minimum |
| 100 to 249 | 30.0% | equaling | 30 minimum |
| 50 to 99 | 50.0% | equaling | 25 minimum |

**Explanation**—Percentages are calculated on actual total output. For example: If the total annual output of a manufacturer is 2,500 cars, at least 8 per cent. of said output, or 200 cars, must be of the same model in order to constitute such model a stock car under this definition. The required percentage of output shall in every case be in accordance with the above table and in no event shall it be fewer than 25 cars.

**Rule 69. Motor Exhaust**—The exhaust must be conducted outside of the bonnet and so directed as not to raise dust.

**Rule 70. Loss of Bonnet**—The bonnet must be carried throughout a contest. If the bonnet becomes detached or lost from a car, the driver shall be required to bring his car to a stop in the shortest possible distance consistent with safety and remain at a standstill until the bonnet has been recovered and replaced.

In a road race he shall not pass the judge's stand until the bonnet has been so recovered and replaced.

In contests on tracks and speedways, a bonnet lost in one lap may be recovered in the next succeeding lap.

**Bona Fide Status of Stock Car**—It is the intention of the rules relating to stock car and stock chassis competitions that such competitions shall be restricted to those cars identical in specification, material and design with the manufacturer's product which is manufactured in quantity and is offered for sale and sold in a bona fide manner to the public through the regular selling agencies of the manufacturer.

**Evasion of Stock Car Definition**—In the event of evasion on the part of entrants of the spirit of the stock car or stock chassis definition concerning points not definitely stated in these rules, the Contest Board shall have full power to render such decision as it may deem for the welfare of the sport and industry.

**Technical Committee**—In any case where it may be necessary to establish the status of any car alleged to be a stock car under the definition contained in these rules, the Technical Committee of the Contest Board shall have the right to visit the factory of the manufacturer of such car, who shall be required to submit to the committee such evidence as it may require to verify the allegation on which the stock status of the car is based.

The Technical Committee shall also have power to take possession of any competing car at the finish of its competition in any contest and make such examination thereof as may be necessary to establish its stock status.

## CLASSIFICATIONS

**Class A. Price Classification**—The numbering of the divisions in this class has been reversed, division 1A being made the lowest priced cars and seven divisions are provided in this class, instead of six as heretofore:

**Class A**—Open to any gasoline motor car other than motor cars with solid tires, wheels 36 inches in diameter and over, which complies with the definition stock car, this class to be run in the following divisions:

| | |
|---|---|
| Division 1A | $ 800 and under |
| Division 2A | 801 to $1,200 |
| Division 3A | 1,201 to 1,600 |
| Division 4A | 1,601 to 2,000 |
| Division 5A | 2,001 to 3,000 |
| Division 6A | 3,001 to 4,000 |
| Division 7A | 4,000 and over |

Extra or optional equipment, listed in the manufacturer's catalog as such, used upon a car competing under price classification, must have its list price added to the list price of the car, and this total price shall determine the classification of the car. No extra equipment shall be permitted other than that listed as such in the manufacturer's catalog.

No car shall compete in any class above that to which its price entitles it.

**Class B. Piston Displacement and Minimum Weight Stock Cars**—The numbering of the divisions in this class has been reversed, division 1B being made the smallest piston displacement, 160 cubic inches and under, and a sixth division has been added for the larger cars. It should also be noted that in this piston displacement class it is intended that cars should compete at their normal minimum chassis weights, the adding or attaching of any dead weight to the car as ballast to enable it to compete in any other division than that to which its normal chassis weights entitle it, being prohibited. To meet this prohibition against ballast, the minimum chassis weights have been reduced 100 pounds in each of the six divisions.

**Class B**—Open to any chassis of a gasoline car which is in accordance with the definition of a stock chassis; to be governed by the following table of piston displacement and minimum chassis weights:

| Division. | Piston displacement in cubic inches. | Minimum weight in pounds |
|---|---|---|
| 1B | 160 and under | 1,100 |
| 2B | 161 to 230 | 1,400 |
| 3B | 231 to 300 | 1,700 |
| 4B | 301 to 450 | 2,000 |
| 5B | 451 to 600 | 2,300 |
| 6B | 601 to 750 | 2,500 |

No car shall compete in any class above that to which its weight entitles it.

No dead weight of any description shall be added to a car or attached thereto in any manner as ballast.

**Class C. Piston Displacement Without Minimum Weight Restrictions or Stock Car Qualifications**—This class has been added to afford an opportunity for competition between motors of approximately equal size, six divisions being provided according to piston displacement but without stock car qualification or minimum weight restrictions.

This class might be considered the experimental or development class.

**Class C**—Open to any gasoline car or chassis made by a factory which has during the 12 months prior to the date of contest produced at least 50 motor cars, not necessarily of the same model. Eligible for entry under the piston displacement limitations of class B, but without minimum weight restrictions.

| Division. | Piston displacement in cubic inches. |
|---|---|
| 1C | 160 and under |
| 2C | 161 to 230 |
| 3C | 231 to 300 |
| 4C | 301 to 450 |
| 5C | 451 to 600 |
| 6C | 601 to 750 |

No car shall compete in any class above that to which its piston displacement entitles it.

The other classes are amended as follows:

**Class D**—Open to any gasoline car which complies with the definition of a motor car without restriction as to piston displacement, weight, price or quantity produced. There may not be more than two events under class D upon a day's program without special permission of the Contest Board.

**Class E**—Special events other than those above specified held in connection with any motor car meet or contest, and approved by the Contest Board of which there may not be more than three upon a day's program without special permission of the Contest Board.

**Class F**—Open to gasoline stock cars of the high-wheeled, solid-tired buggy type, diameter of wheels 36 inches or over. Entries subject to price limitations of class A. There may not be more than two events under class F upon a day's program without special permission of the Contest Board.

**Class G**—Open to electric stock cars only. Subject to the price limitations of class A.

**Class H**—Open to commercial cars, cabs and trucks. Division limitations to be obtained from the Contest Board.

**Match Races**—Matches may be held as contests of any kind cov-

ered by any of these rules and may be run under any of the classes or divisions.

### GENERAL AND SPECIAL RULES

The contest rules have been rearranged and classified into: (a) General rules applicable to all contests, and (b) special rules for each of the various forms of contests as follows: Special rules for road races. Special rules for track races. Special rules for long distance track and 24-hour track races. Special rules for hill-climbs. Special rules for reliability contests and tours.

### GENERAL RULES

**First**—Provisions have been made for the appointment by the Contest Board of the referee for every contest, from a selected list of men of undoubted standing, familiarity with and ability to administer the contest rules, located in every locality where contests will be held and known to the promoting clubs and associations in those localities.

**Second**—To the further end of establishing and maintaining the strict compliance of all entrants with the stock car requirements of the rules, a technical committee is provided, of which the associate member of the A. A. A. Technical Committee in the district where the contest is held, shall be chairman, together with such other technical members as the promoter may appoint, to technically inspect all cars offered for competition and to prevent the entrance of other than bona fide stock cars.

**Third**—The third element to complete the organization of the Contest Board is found in the official representative of the board previously provided for, who will be in attendance at every contest to co-operate with the referee and the Technical Committee in the strict enforcement of all the Contest Board rules.

**Entries**—The promoter is prohibited, under pain of disqualification, from advertising the proposed competition of any entrant in a contest until his entry has been actually made. The promoter is also required to secure a signed entry blank and entry fee from a proposed entrant, in order to bring such entrant within the jurisdiction of the Contest Board's discipline in case of his failure to appear.

**Supplementary Regulations**—In order that the governmental functions and supervision of the Contest Board may extend to every form of contest, a promoter desiring to make regulations for some particular form of contest not included in the published rules of the Contest Board, may do so upon submitting such supplementary regulations to and receiving the approval of the Contest Board.

**Certified Trials**—To put the stamp of authenticity upon any special form of road trial or test of an individual motor car or accessory, the maker, owner, agent or dealer may secure from the Contest Board an official sanction for such trial, which will be carried on under the supervision of a representative of the Contest Board under the general rules and the special rules of the board in such case provided.

**Advertising**—To prevent the holding of contests which could not, in any way, redound to the benefit of the sport and idustry, the following rule has been adopted.

"Any owner, manufacturer, dealer, agent or driver taking part in or directly connected with any contest otherwise than under these rules, and obtaining extensive advertising therefrom, shall be deemed to be guilty of a breach of these rules."

**Records**—To prevent the indiscriminate advertising and improper comparison or performances or alleged records, all claims for records must be made to the Contest Board within 10 days of their accomplishment and no record shall be advertised until accepted and allowed by the Contest Board. The board may reject any claim which in its opinion would not promote the best interests of the sport.

No claim for a record at a distance under 1 mile and up to 5 miles will be allowed unless taken with a recording automatic timing device and the actual recorded evidence submitted.

Provision is made for a register of records to be kept by the Contest Board.

**Racing Drivers' Register**—All racing drivers are required to register with the Contest Board and receive a registration card, such registration expiring on December 31 of each year. A detailed record of each driver's participation in contests throughout the year will be kept. Drivers are required to exhibit their registration cards to the referee on demand at any meeting.

An unregistered driver may not compete in any sanctioned event.

**Amateur Definition**—The definition of an amateur is amended by adding an additional restriction so that "no one who is actively engaged in the motor car or accessory industry" may compete as an amateur.

**Amateur Drivers' Register**—For the protection of the amateur driver and to afford bona fide amateur competition, an amateur drivers' register has been established, requiring annual registration with the issuance of a registration card by the Contest Board.

An unregistered amateur may not compete in sanctioned events.

**Amateur Entries**—An amateur shall neither enter for nor drive in any contest a car which is the property of any person or corporation actively engaged in the motor car or accessory industry.

**Powers of Referee**—For the safety of all concerned, the referee's powers have been broadened, as follows:

He shall prohibit any driver or mechanic from entering or continuing in any contest who, in his opinion, is physically unfit.

He shall have the right to stop a race before its scheduled termination if emergency demand such action, and in such a case no award shall be made.

He may order the postponement of an event for any reason which, in his judgment, after consultation with the promoter and representative of the Contest Board, may be valid.

At his request, a driver or mechanic must furnish a physician's certificate as to his physical and optical fitness to enter a race, or may be required to submit to a test to determine such fitness.

The following provision has also been added to the duties of the referee:

"The referee may disqualify any driver, mechanic, entrant or entrant's representative who shows discourtesy toward any official."

**Delivery of Prizes**—In the event of a protest, or an appeal to the Contest Board from the decision of the referee, no prizes shall be delivered until an official decision is rendered.

**Promoter's Liability**—Promoters are required to use every precaution in the proper preparation of the track or course and the proper safeguarding of same during practice or the running of a contest, and shall be held responsible for any accidents resulting from their negligence in these matters.

**Unadulterated Fuel Supply**—Stringent regulations are provided for the testing of contestant's gasoline and to insure the use of a standard and unadulterated fuel supply. Disqualification of the owner, entrant, driver and car, or all of them, is the penalty.

### SPECIAL RULES FOR ROAD RACES

The protection of the public and of the contestants being the paramount consideration in the running of a road race, the following rules have been adopted:

**Permits to Use Road**—Before official sanction will be granted for a road race, hill-climb or speed trial, or any other competition on the public highway, a promoter shall first obtain the properly authorized permission of any and all local authorities for the use of such highway and shall file the original or a certified copy of such permission with the Contest Board.

# MILESTONES FOR THE AUTOMOBILIST

Feb. 24-Mar. 3...Toronto, St. Lawrence Arena, Canadian Automobile Show, Ontario Motor League. E. M. Wilcox, Mgr.

Feb. 28-Mar. 5...Omaha, Neb., Auditorium, Automobile Show, Omaha and Council Bluffs Automobile Dealers.

Feb. 28-Mar. 5...Kansas City, Convention Hall, Fourth Annual Automobile Show, Automobile Dealers' Ass'n.

**Mar. 5-12.....Boston, Mechanics' Building, Eighth Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, General Manager, 5 Park Square.**

Mar. 5-12.....Cleveland, Central Armory, Cleveland Automobile Club, Eighth Annual Show.

Mar. 5-12.....Des Moines, Ia., Coliseum, First Annual Automobile Show, Des Moines Automobile Dealers' Ass'n.

Mar. 7-12.....Albany, N. Y., Armory, Automobile Show.

Mar. 15-19.....Syracuse, N. Y., State Armory, Automobile Show, Syracuse Automobile Dealers' Association.

Mar. 15-19.....Bridgeport, Conn., Automobile and Aeronautic Show, Bridgeport Automobile Dealers' Ass'n.

Mar. 17-19.....Louisville, Ky., Automobile Show, Louisville Automobile Dealers' Association, in the Louisville Armory. Hubert Levy, Secretary.

Mar. 21-30.....Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show, Buffalo, Launch Club. D. H. Lewis, Mgr., 760 Main St.

Mar. 21-28.....Denver, Col., Convention Hall, Denver Motor Club's Annual Automobile Show.

Mar. 26-Apr. 2....Pittsburg, Pa., Duquesne Garden, Fourth Annual Show, Automobile Dealers of Pittsburg. Frank D. Sauppe, Chairman.

Mar. 26-Apr. 2...Montreal Automobile and Motor Boat Show, Official Motor and Sportsmen's Show Committee of the Automobile and Aero Club of Canada, in the Coliseum. E. M. Wilcox, Manager, 123 Bay St., Toronto.

Apr. 23-29.....Bangor, Me., Auditorium, Second Annual Eastern Maine Automobile and Motor Show. J. Henry Graham, Manager, Old Orchard, Me.

### RACES, HILL-CLIMBS, ETC.

Feb. 19-20.....Los Angeles, Ascot Park Track, Track Races of Los Angeles Motor Racing Association.

Feb. 22.....Oakland, Cal., Hill Climb, Auto Trades Association of Oakland and Alameda County, Cal.

Mar. 5.....New York to Boston, Voting Trophy Contest, T. F. Moore, Manager, 91 West 103d St., New York City.

Mar. 19.....Altadena, Cal., Hill Climb, Licensed Motor Car Dealers' Association, Los Angeles, Cal.

### FOREIGN SHOWS AND RACES

Feb. 18-26.....Manchester, England, Automobile Show.

Feb. 20-23.....Swedish Automobile Races and Trials.

Mar. 19-Apr. 3...Berlin Automobile Show.

Mar. 22.....Monte Carlo Elegance Competition.

Mar. 27-Apr. 4...Prague, Austria, Hungary, Automobile Show.

Mar. 28.....Brooklands, England, Easter Meeting.

Mar. 31-Apr. 8...French Spring Wheel Competition.

Apr. 2-24.....Turin, Italy, Automobile Show.

Apr. 27-28.....Brooklands, England, Two-Day Meeting.

May 1-Oct. 1.....Vienna, Austria,-Hungary, Automobile and Aviation Exposition.

May 28-June 9...St. Petersburg, Russia, Automobile Exhibition.

June 2-8.....Prince Henry (German) Touring Competition.

THE AUTOMOBILE

Vol. XXII Thursday, March 3, 1910 No. 9

THE CLASS JOURNAL COMPANY

H. M. SWETLAND, President
A. B. SWETLAND, General Manager
231-241 West 39th Street, New York City

EDITORIAL DEPARTMENT

THOS. J. FAY, Managing Editor
MORRIS A. HALL GEORGE H. GODLEY
W. F. BRADLEY, Foreign Representative

ADVERTISING DEPARTMENT

W. I. RALPH, 1035 Old South Bldg., Boston LOUIS R. SMITH, New York
C. H. GURNETT, F. W. VAN SICKLEN, 1200 Michigan Ave., Chicago H. L. SPOHN, New York
T. B. VAN ALSTYNE, Philadelphia FRANK B. BARNETT, Cleveland
H. H. GILL, Detroit

Cable Address - - - - - - - - - - - - - - - Autoland, New York
Long Distance Telephone - - - - - - - - - - - 2046 Bryant, New York

SUBSCRIPTION RATES

United States and Mexico - - - - - - - - - - - - - - One Year, $3.00
Other Countries in Postal Union, including Canada - - - - One Year, 5.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

FOREIGN SUBSCRIPTION AGENTS

ENGLAND:—W. H. Smith & Sons, Ltd., 186 Strand, London, W. C., and all bookstalls and agencies in Great Britain; also in Paris at 248 Rue de Rivoli.
FRANCE:—L. Baudry de Saunier, offices of "Omnia," 20 Rue Duret, Avenue de la Grande Armee, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907

Autoing in foreign lands presents the advantage to one of becoming ultimately acquainted with the byways, the natives in their simple aspect, and the vagaries of the countryside. It is a pleasureable pastime, and as remote from the boredom of conventional forms of doing other lands as anything can be.

The anticipation of pleasure in this form is not in the absence of other and equally attention-drawing phases. If reliance is placed upon "cars to hire" in the industrial haunts of the many lands, it demands self-restraint almost in excess, to keep down the qualms which foreshadow remorse, and, in the long run, the cost is likely to be overmuch.

If the automobile is to be taken along, it may, or may not, be necessary to include a chauffeur; the skill and inclination of the owner will settle this important phase. At all events, the automobile must be properly boxed for transportation, and this essential is so frequently left to a carpenter of no enterprise, that the end is plainly not pleasant to contemplate. To be sure that an automobile will survive a voyage, is to box it properly, and a man of some knowledge and experience should be entrusted with the undertaking.

Insurance must be taken out, with permission to go abroad, and this is not a detail which can be disposed of offhand. Insurance underwriters are disinclined to act in haste.

Custom requirements differ in the several countries, and tariff regulations must be observed on the frontier of every principality. In the absence of knowledge of the laws, customs, and inclination of the "natives," it is a task of moment; the score will mount up, and the pleasure which should attend a tour, will be dimmed by sad experiences. As a rule, courtesy and firmness will make headway against the bickerings of an obdurate official, but firmness is only to be fortified when knowledge is a companion.

Autoists, after they run an automobile through its second season, perhaps are, in quite a number of instances, conscious of a something which falls short of due explanation. The original sweet-running qualities lapse, and scrubbing the carbon from off the combustion chamber surfaces fails to effect a cure. After a few trips to the repair shop, the discovery is made that it is the cooling system which must be corrected, and how to rehabilitate the same is a problem. A little investigation in proper channels is enough to disclose a condition of incrustation, and, within the confines of a radiator the hard crust persists despite treatment. There is no room for a scraper, and there seems to be no other way to remove the coating. This form of trouble is least in radiators which are of sufficient area to keep the water well below the boiling point, and autoists, if they will not run on a retarded spark, will lengthen the useful life of the cooling system.

When an automobile is to be left unused, by the curb, to stop the motor is advisable, not only because it is economical of fuel, but in order to prevent overheating of the cooling water.

There should be some way of aiding autoists, or those who desire to purchase, which would enable them to reach conclusions which would be in accord with the facts and in harmony with their respective situations. As it is, they are prone to take too much time discussing "selling points" and very little time consulting their own needs. The real situation is that the needs are first and the supply must satisfy the demand. If a system of "points" could be devised on a basis which would serve the needs of the mechanically disinclined, it would be a relatively easy matter for the budding autoist to go into a show and examine such of the several hundred models as would promise to come within the requirements.

There are two angles to take, however, and the point system would have to be so contrived as to satisfy the situation bearing this matter in mind. The man who has a limited amount of money wants an automobile with a limit to its first cost and he naturally will be interested in the cost of maintenance. Since the speed of a car will largely influence the cost of maintenance (independent of the quality of the material and workmanship to a considerable extent) the system to use is one which will allow for speed as it induces depreciation, and at the same time reflect the presence of material as it is good, or otherwise, and appropriateness of design from the point of view of the prospective user considering his needs. The average intending purchaser is very prone to think that a design is not very good, if, in his judgment, it falls short of his own particular needs, and in thus hastily reaching a conclusion, he fails to remember that some other possible user will find what he may want in the very automobile so hastily judged.

# LOCAL SHOWS FLOURISH THE COUNTRY OVER

## CINCINNATI SHOW REPORTS MANY SALES

CINCINNATI, Feb. 27—Music Hall closed its doors at 11 o'clock last night on the most successful automobile show ever held in this vicinity, after a jollification in which Anna Held and her company played a prominent part. There can be no doubt that henceforth the automobile shows under the auspices of the Cincinnati Automobile Club will be held annually.

It was the most complete exhibition of cars the residents of the city and its neighborhood have ever seen, and the decorations enhanced the effect. An army of out-of-town salesmen was here, and all found time to compliment the management on its work. As most of them had made the round of New York, Buffalo and Chicago, their judgment should be valuable.

It would be hard to give the exact number of sales made during the week, but the records would speak well for everybody. The Jungclas Automobile Company, which is the local agent for the Mitchell, showed the signatures of 36 actual buyers, 16 of them credited to subagencies. The Enger Company, a new manufacturing firm of this city, sold 50 cars in one day to subagencies, besides making a number of individual sales. The Cadillac Company reports that it sold 16 cars during the week. The Cino and Ohio, other new local products, also disposed of a large number. Powel Crosley, of the Haberer Company, which makes the Cino, booked an agency in Indianapolis which has contracted for 25 cars. The Cino will be exhibited at the Kansas City, Mo., show, and the Ohio is on exhibition at Cleveland and Boston.

## MILWAUKEE'S SHOW TAXED TO CAPACITY

MILWAUKEE, Wis., Feb. 28—Milwaukee has again outdone her former achievements in the matter of an automobile show which opened there on February 22 under the auspices of the Milwaukee Automobile Club, and, according to consensus of opinion, this exhibition is said to have been a fine and most varied exposition of the automobile industries.

The show practically opened in the afternoon, when General Manager Clarke S. Drake and the show committee, consisting of M. C. Moore, Christ Schlotka, L. A. Dearholt, O. F. Fishedick, Dr. Louis Fuldner, gave a reception to members of the Milwaukee Automobile Club and a number of guests. This function took the form of a "private view" and was followed by a luncheon.

This exhibition covered about 40,000 square feet of floor space, and the auditorium in which the show was held was beautifully decorated. All of the sixty-two boxes encircling the arena was occupied by Milwaukee and Wisconsin society people, while the 4,000 seats in parquet and balcony were free to visitors at all times.

In the matter of exhibitions, it is said that applications for space far exceeded the capacity of the auditorium and every nook and corner was utilized by the exhibitors.

## PORTLAND MADE GOOD WITH 1910 SHOW

PORTLAND, ME., Feb. 28—The show ended Saturday to the entire satisfaction of the management, and will be reserved in the minds of local automobile enthusiasts for a considerable time to come as one of the real situations, portraying a condition of stability, and the healthy growth of the automobile industry. The auditorium in which the show was held was appropriately spruced up for the occasion, and it was common accord among the visitors that Frederick M. Prescott has reached a point in his managerial career where experience and acumen is scarcely to be enlarged upon. The attendance seems to have been on a sufficient basis to infringe upon comfort, a condition, by the way, which is scarcely to be counted when confronted by the enthusiasm which was displayed by the veteran autoists who have always lent support to Portland's effort, and the keenness of the prospectives who hovered over the automobiles which reached more nearly to the level of their respective ideals. The exhibitors, a number of which represented important local industries, included in their wares a class of cars which measure up to the exacting requirements of the keen New Englanders.

### THE EXHIBITORS AND THEIR WARES AT PORTLAND

| | |
|---|---|
| Apperson | Russell & Company |
| Buick | Buick Motor Company |
| Cadillac | Mank-Stuart Motor Company |
| Elmore | F. R. Parker & Company |
| E-M-F | Maine Motor Carriage Company |
| Ford | Spear Auto Company |
| Flanders "20" | Maine Motor Carriage Company |
| Fuller | Fuller Auto Company |
| Grout | Portland Motor Mart |
| Inter-State | Portland Motor Mart |
| Knox | The Portland Company |
| Maxwell | Stoughton-Folkins Company |
| Marion | Frank F. Wentworth |
| Mitchell | L. C. Gilson Automobile Company |
| Oakland | Stoughton-Folkins Company |
| Overland | Frank F. Wentworth |
| Oldsmobile | Stoughton-Folkins Company |
| Palmer-Singer | Taxicab Cab Company of Maine |
| Paterson "30" | W. A. Paterson Company |
| Peerless | Maine Motor Carriage Company |
| Pope-Hartford | Maine Motor Carriage Company |
| Premier | L. C. Gilson Automobile Company |
| Rambler | Stoughton-Folkins Company |
| Regal | Portland Motor Mart |
| Reo | F. Burgess |
| Selden | F. A. Nickerson Company |
| Stanley | L. C. Gilson Automobile Company |
| Speedwell | Portland Motor Mart |
| Stevens-Duryea | Maine Motor Carriage Company |
| Studebaker | Bullock-Goodwin Company |
| Velie | Pine Tree Auto Company |
| White | Portland Motor Mart |
| Warren-Detroit | Harrison & Tenney |

## BIG EASTER SHOW FOR PITTSBURG

The fact that the fourth automobile show in Pittsburg will be an Easter event has led the committee to provide a unique feature in the opening ceremony. A monstrous Easter egg suspended in the middle of the great auditorium and on the stroke of eight on opening night Mayor William A. Magee will pull a string opening the Easter egg and showering Easter blossoms on the crowd.

This show given under the auspices of the Automobile Club of Pittsburg opens in Duquesne Garden, Saturday, March 26, and indications point to the most successful exhibition of this kind ever held in smoky city. The committee in charge will spend more than the usual amount for lighting purposes alone, and the brilliancy of the Garden will surpass any previous illuminating effect. Entries for the show to date are large, 36 automobile firms have engaged space and about 30 accessory exhibitors will be taken care of. Following is a complete list:

Arlington Automobile Company, Center avenue, Pittsburg; Buick Motor Car Company, Baum street, Pittsburg; East End Automobile Company, Baum street, Pittsburg; Ford Motor Car Company, Highland avenue, Pittsburg; Fort Pitt Motor Manufacturing Company, New Kensington, Pa.; Franklin Automobile Company, Baum street, Pittsburg; L. Giesenkamp Company, Penn avenue, Pittsburg; the Hiland Automobile Company, Center avenue, Pittsburg; Inter-State Sales Agency, Center avenue, Pittsburg; Keystone Automobile Company, Center avenue, Pittsburg; Kline-Kar Motor Company, Hay street, Williamsburg, Pa.; H. Lang Wagon Company, S. St. Clair street, Pittsburg; Larimer & Lowry, West Newton, Pa.; Liberty Automobile Company, Center avenue, Pittsburg; Martin & Mars, Forbes street, Pittsburg; Maxwell-Briscoe Company, Forbes, and Meyran avenue, Pittsburg; Mutual Motor Car Company, 5518 Walnut street, Pittsburg; McAlister Brothers, Penn avenue, Pittsburg; McCurdy-May Automobile Company, Baum street, Pittsburg; Pennwood Auto Supply Company, Fulton Building, Pittsburg; Pioneer Auto Company, Baum street, Pittsburg; Pittsburg Automobile Company, Grant boulevard, Pittsburg; Pittsburg-Mitchell Company, Baum street, Pittsburg; Pittsburg Speedway Motor Company, Ltd., Wilkinsburg, Pa.; Premier Sales Company, Beatty street, Pittsburg; Pullman Motor Car Company, York, Pa.; Sebring Motor Car Company, Sebring, O.; Speedwell Automobile Company, Center avenue, Pittsburg; Standard Automobile Company, Baum street, Pittsburg; Studebaker Auto Company, Forbes Field, Pittsburg; E. J. Thompson & Company, Penn avenue, Pittsburg; Urling & Company, Center avenue, Pittsburg; Vestal Motor Car Company, Highland avenue, Pittsburg; The White Company, Beatty street, Pittsburg; Wilkinsburg Auto Garage, Wilkinsburg, Pa.; the Winton Company, Beatty street, Pittsburg.

## CHALMERS OFFICIAL GLIDDEN PATHFINDER

After a careful consideration of the competitive proposals submitted by a number of manufacturers for the privilege of furnishing the Official Pathfinding Car for the 1910 Glidden Tour, the Contest Board has awarded this privilege to the Chalmers Motor Company, of Detroit.

The Chalmers car which is to lay out the route will commence its work sometime during the month of April, as soon as the roads are in a fit condition to determine the most practicable route.

The futility of the efforts of a car of another make than the Chalmers, now attempting to go unofficially over the road, and the unreliability of the road information which such car can obtain at this season of the year is self-evident. The roads over the proposed route of the tour are in such condition at the present time that the route which any car would have to take would of necessity include many detours and be entirely at variance with the route which will be selected by the Chalmers Official Pathfinding Car when it goes over the territory in the proper season.

Intending entrants in the tour should not be misled by the road reports from any self-appointed or unofficial pathfinding car making an unseasonable run, but should wait for the reliable and authentic information which will be contained in the reports of the "official pathfinder."

The Contest Board also contemplates the changing of the tentative route in some of its important particulars.

Contest Board, American Automobile Association,
S. M. Butler,
February 28, 1910. Chairman.

## WISCONSIN STATE A. A. TOUR

The Wisconsin State Automobile Association is planning for the first annual state tour, with President Moore as a leading promoter. The American Automobile Association has granted the Wisconsin State Automobile Association an official sanction. The tour will probably start at the Public Library, Milwaukee, thence to Whitewater, and along the north shore of Lake Geneva to Beloit, where the first night control will be established. The second day's run is from Beloit through Janesville, Monroe to Madison for overnight stop. Madison to La Crosse is planned for the third day's run. Eau Claire to Chippewa Falls on the fourth day; thence to Marshfield to Wausau, Merrill on the fifth; the sixth to Appleton; thence from Appleton to Green Bay, Manitowoc, Sheboygan to Milwaukee on the seventh. This tour is to be open to private owners as well as dealers and manufacturers and the profit derived will be used exclusively for measuring roads, placing signboards and marking turns, also for working up legislation, prosecution of reckless drivers, protection of members and the creation of a legal fund.

## IMPORTANT R.R. SHIPPING CONCESSION

In the matter of automobile shipment, J. S. Marvin, general traffic manager of the National Association of Automobile Manufacturers, announces a change in the rules which will simplify matters considerably in securing cars at the factories for automobile transportation.

It is known that many factories require freight cars no longer than 36 feet; also that railroads frequently supply 40-foot cars with a proportionately higher charge. Rather than wait indefinitely for 36-foot cars, many manufacturers, to effect prompt delivery, have used 40-foot cars at considerable additional expense in the matter of freight charges. The new ruling effective April 1, 1910, provides that when factories order 36-foot cars and the railroads are unable to furnish cars of that length said railroads will send instead 40-foot cars, with freight charges computed on the 36-foot basis, provided, of course, that machines loaded in the 40-foot cars are small enough to have been shipped inside of a 36-foot car.

## BUDLONG ACCEPTS HEAD OF N.Y. DEALERS

At a special interview with M. J. Budlong, president of the Packard Automobile Company of New York, the representative from The Automobile ascertained that the delay on the part of Mr. Budlong in accepting the presidency of the Licensed Automobile Dealers' Association of New York was due to press of business, and the aggregate of private interests, which, as Mr. Budlong stated, absorbed so much of his time that he felt called upon to explain to his associates that he would have to more or less neglect important matters, were he to accept the presidency of the association. Events proved too strong for Mr. Budlong, and the unaminous demand on the part of the members of the association, which was vigorously supported by the committee, resulted in his reconsideration of the situation and the final acceptance of the presidency of the association. It is too early in the life of this new member of the association family to expect action which could be construed as anything more than routine, and from what the new president states, it is logical to conclude that the good of the industry will be consulted, in every case, before a serious campaign will be inaugurated.

George W. Bennett, New York manager of the White Company, has been made vice-president; C. P. Skinner, New York agent for the Mitchell car was elected secretary and treasurer.

## N. Y. AUTO TRADE ASS'N EXPANDS

Plans were launched for a very material expansion in the membership and scope of the New York Automobile Trade Association at the meeting of the board of directors, held recently, and a vigorous campaign has been started to bring the membership up to the standard and in keeping with the number of concerns handling automobiles and supplies and operating garages in New York City. It is expected that 40 or 50 concerns will become members during the next few weeks. The association's credit department will be enlarged and broader plans are on foot for making more effective standardization of the garage division. In this latter work, a special committee in charge has plans under way to standardize the prices of garage charges, in the matter of storing cars and the prices of gasoline oil and other supplies.

An auxiliary committee will be established for the purpose of correcting many abuses and will work with the city authorities to stop irregularities, and to secure proper legislation on matters of interest in the automobile fraternity.

## NUCKOLS TO BE PRESIDENT OF E. V. CO.

The latest inside report from Hartford, which, however, is not officially confirmed, gives to H. W. Nuckols the presidency of the Electric Vehicle Company, which concern, it will be remembered, recently joined the coterie which made up the United States Motor Company with an aggregate capitalization of $16,000,000. Mr. Nuckols has been with the E. V. Company from its inception, and occupied the position of treasurer and secretary up to the time of the receivership, and was appointed receiver, in which position his skill and efficiency brought the company out of the woods. Benjamin Briscoe, president of the Maxwell-Briscoe Company, and the prime mover in the big United States corporation, was not to be reached before going to press, but he will no doubt come out with an official statement confirming the above within a short time.

## STREET CAR STRIKE KEEPS AUTOS BUSY

The automobile is again proving its worth in Philadelphia, where, for a time, the entire stoppage of the trolley service—due to the strike—practically tied up the city. Not alone were the police officials and roundsmen transferred from point to point, but the taxicab service was worked to the limit night and day; in fact, aside from the use of several hundreds of horse-drawn vehicles, automobiles were practically the only means in transportation service that turned a wheel.

## GOODRICH IS WELL HOUSED IN BOSTON

In the commercial progress of New England during the past ten years the tire and rubber business has undergone a wonderful development, and a shining example of the individual prosperity of one firm is shown in the remarkable growth of the business of the B. F. Goodrich Company, which has recently taken possession of its new six-story building at 851-857 Boylston street. The home of the B. F. Goodrich Company is in Akron, Ohio, and throughout the United States it maintains a number of central distributing plants with Boston as a base of supplies for New England territory. When the automobile industry was in its infancy about nine years ago, Howard Limric came to Boston in charge of the Goodrich branch, which was then located on the second floor of a business block on Kingston street and the entire force of the tire department consisted of four men. As the automobile began to grow in popularity there was a corresponding increase in the demand for Goodrich tires and with the increase in business the company moved to Columbus avenue where it soon outgrew its facilities for doing business and finally made plans for the erection of a building designed for its particular branch of trade. The little acorn planted on Kingston street has now grown to be one of the giants in its line employing a force of sixty men in the handsomely new appointed building which with its six floors and basement gives a total of 30,000 square feet of floor space. The building has a 44 foot front on Boylston street and is 97 feet deep with a 15 foot sidewalk set back. The building is of reinforced concrete with granolithic floors and is as near fireproof as up-to-date construction methods will permit. In general design the building is after the modern French style and the architects, Kendall & Taylor, have worked out a very pleasing front of white glazed terra cotta and a rich effect is produced by the use of marble dados for the two entrances. The salesroom is on the first floor, taking up almost the entire width of the building. This salesroom is finished with an eight foot wainscoting of Central America mahogany and the floor covering is of rubber interlocking tiling. It is a very pretentious looking salesroom and no expense has been spared in its equipment. In the rear of the salesroom is the shipping room which is so arranged that all deliveries are made through one door and the goods received come in by another door so as to avoid any confusion. In the delivery department the express company messengers receive their goods from individual compartments and in order to facilitate matters a private shipping court runs into the building affording ample room for automobiles and express wagons without blocking the alleyway in the rear of the building. The general office and private offices are located on the second floor. These rooms are finely equipped for the purposes for which they are intended and in the private offices the furniture is of fumed oak.

The third and fourth floors are used exclusively for the storing of tires. The different sizes are kept on separate racks and these are adjustable so that they can be used for any size of tire. These floors have a capacity for storing 9,000 tires.

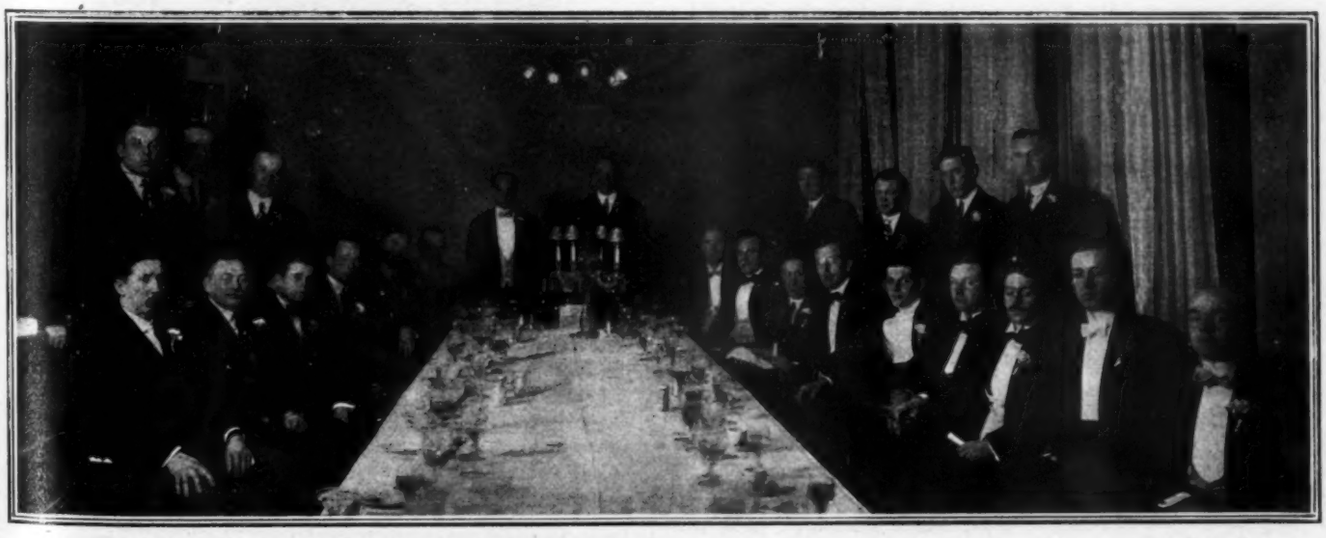
The fifth floor is a huge storeroom for the extensive line of mechanical and specialty rubber goods manufactured by the B. F. Goodrich Company. These articles include most everything made of rubber except mackintoshes. The top floor is used for a repair and adjustment department with an equipment that meets the requirements of the business in a very satisfactory manner. The basement of the building is used for bicycle and automobile sundries with a complete list of articles that come under the classification of accessories. In designing the building the architects have sought to produce the best of facilities for the handling of this business and the elevator service is all that could be wished for with an electric passenger elevator in the front of the building and a freight elevator in the rear, in addition to an electric lift.

## BIG MILEAGES IN WESTERN BAD LANDS

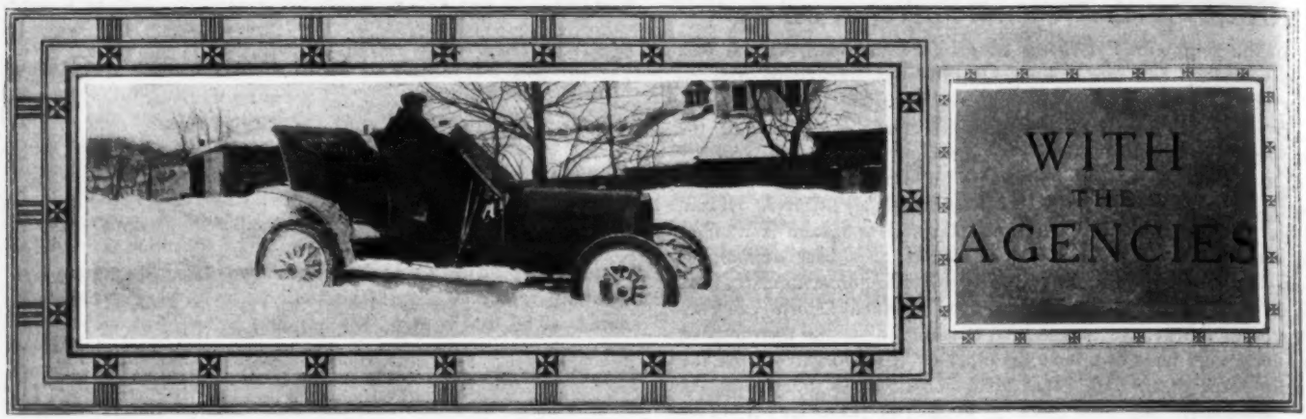
From New Mexico comes the story of James Stocker, a mailman, of Torrence, New Mexico. Stocker has three 1905 two-cylinder opposed horizontal engined Buicks with which he claims to make the 110 miles between Torrence and Rockwell, New Mexico, every day with the Government mails. He says that from January 15, 1906, to the present these three cars have missed but three days and have always been on time. According to Stocker's story, the only time the cars were ever tied up was during a three-day blizzard when the snow became too deep for anything but snow-shoes or skis. Stocker has a government mail contract and his cars run every day having each made 165,000 miles since being placed in commission.

## BRIDGEPORT CLIMB TO HAVE MORE ENTRIES

At Bridgeport, Conn., will occur the fifth annual hill climbing contest of the Automobile Club of Bridgeport on May 30. Preparations are being made to have this event more elaborate than ever before, and additional safeguards will be provided for both spectators and contestants, with the State Militia to guard the course. The McMurty electric timing system will be used as before, and along the rack, at 1/8 mile intervals telephones will be placed. It is expected that there will be one hundred entries for this event—at least fifty more than last year.



Farewell banquet given at Yates Hotel by Automobile Dealers' Association of Syracuse on occasion of departure of F. R. Bump, sales manager of the H. H. Franklin Mfg. Company to become sales manager of the Owen Motor Car Company, of Detroit, Mich.




One of the cars of which Massachusetts is proud; a Grout car, under the guidance of William Adams, chief tester of the Grout Automobile Company, Orange, Mass. The snow almost hub-deep makes little difference to this sturdy and powerful car.

The Swinehart Tire & Rubber Company have just opened a new branch in Philadelphia at 1437 Vine street, with D. Thos. Keenan as manager. A complete line of solid and pneumatic tires will be carried in stock at the new branch, and Mr. Keenan is well known, having been identified with the automobile and accessory business for several years. With its increased factory facilities the Swinehart Company will be able to handle a large volume of business during the year of 1910, and some good contracts have been received by the company from manufacturers located in the Philadelphia territory.

George B. Craven, formerly of Detroit, has been appointed distributor of the E-M-F and the Flanders cars. He will have headquarters at Cleveland. Twenty-one E-M-F cars have been received by the branch and these will be placed on exhibition in one of the most commodious salesrooms in Cleveland. Mr. Craven has been connected with the automobile industry since its inception, and for some time was a member of the staff of the General Motors Company at Detroit.

Chase motor wagons have entered the San Francisco market. William H. Durphy, formerly sales manager of the Chase Company, has opened an agency in that city. In this connection it is said that A. M. Chase, president of the Chase Motor Truck Company, reports that it has closed a deal with Leyland Motors, Ltd., of London, England, for 1,200 Chase wagons, to be taken in five years.

Fred R. Hill and Harry Weber are now connected with the Stewart & Clark Mfg. Co. traveling forces. Mr. Hill will make his headquarters in Philadelphia, covering Pennsylvania and Southern territory. Mr. Weber will be in Kansas City to cover the Southwest in the matter of handling Stewart speedometers. Both were formerly with Herz & Company.

Edward Miller has opened a salesroom at 705 Ann street, Columbus, O., where he handles the Premier. Mr. Miller was formerly associated with W. K. Mathews in the Miller-Mathews Company which handled the Jackson and Premier. After the partnership was dissolved the O. G. Roberts Company took the Central Ohio agency for the Jackson.

The Seamless Rubber Co., of New Haven, Conn., has just opened a New York branch office, located at 2002 Broadway, where a full line of this company's goods will be handled. Principally the Bragg stitched tire will be handled, or at least pushed, this tire having made a big hit at the recent New York shows.

The Ohio Auto Sales Company is the name of a new sales agency for Columbus, O., which has established a temporary office at 27 West Russell street. Later it will move into a room at Goodale and Front streets. W. B. Zimmerman is general manager, and the company is Central Ohio agent for the Ford.

The Automobile Accessories Company, of Pittsburgh, is opening at Centre avenue and Beatty street. This concern has the exclusive agency for the Pennsylvania tire in the Pittsburgh district. Wm. B. Yoder is manager.

The Weaver-Ebling Automobile Company, 2230 Broadway, New York, have taken an agency for the Harley-Davidson motorcycle. Their territory includes New York, Long Island, Staten Island, Westchester and vicinity.

H. C. Whittaker, president of the Wheeling Corrugating Company, has taken the agency for the Rainier car in the northwestern section of West Virginia and the southeastern section of Ohio, with headquarters in Wheeling.

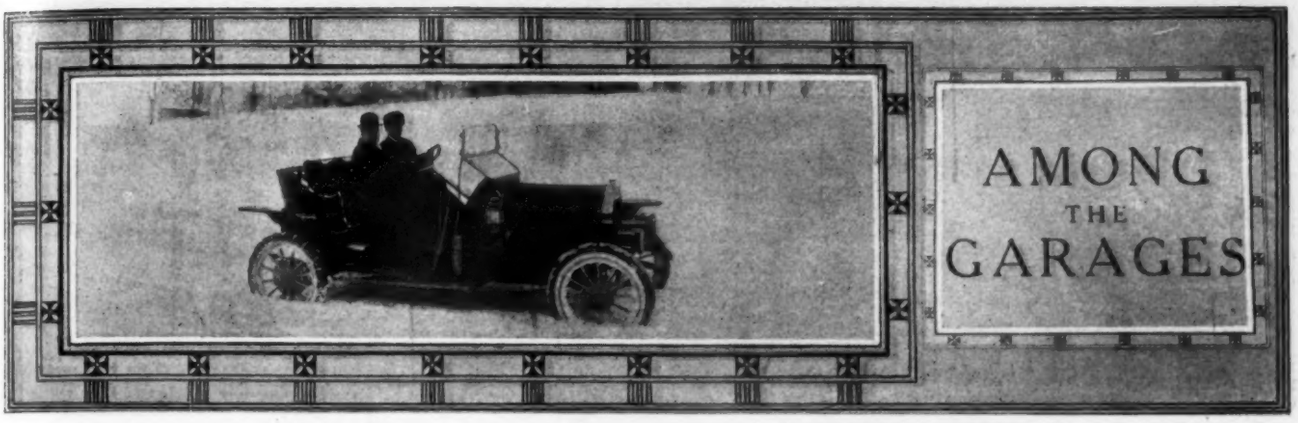
The Early Automobile Company, of Columbus, O., added two more agencies to its line by taking the Southern Ohio rights for the Whiting and the Warren-Detroit. Delaware County is also included in the territory.

George D. Knox, local agent for the Peerless and the Hudson in Hartford, Conn., has completed alterations in the general offices, 210 Pearl street, which will permit of the display of cars on the office floor.

The Way-Mitchell-Rigden Company, Cleveland, Ohio, agents for Republic tires and Stromberg carbureters, has secured the agency for Harris oils.

Wayne Davis, well known in the Philadelphia trade, has secured the agency for the Everitt "30."

J. Fortesque, secretary of the Bay State Automobile Association, one of the men who have helped it to its present success.




A typical Winter scene, in which a Speedwell roadster plays a prominent part. Automobiling is coming more and more into prominence as a Winter sport, and the number of owners who lay up their cars during this season is diminishing every year.

Mobile, Ala., has a new garage, conducted by the Ross Motor Company. Alfred G. Ross, the manager, has been with Bloch Brothers and the Mobile Auto Company for the past four years, so is no stranger to the selling end. He is also the secretary of the Mobile Automobile Club and vice-president of the Alabama Automobile Association. The Ross Company has an up-to-date garage, and will handle the Moon and the Rapid commercials.

Halladay automobiles will be handled in Georgia by Boyd-Patterson Company, with headquarters at 287 Edgewood street, Atlanta. The Streator Motor Car Company, maker of this well-known automobile, is pushing out, and in selecting this company as distributor, wisdom has been displayed. The establishment in Atlanta is well equipped with every facility, including tools, mechanics, and a wealth of experience.

The new garage building for the Ford Automobile Agency, of Wichita, Kansas, now in course of construction, will measure 140 ft deep by 50 ft. wide, and three stories high. The first floor will be the salesroom for cars and accessories, while the second will be storage and machine shop, this being very complete. The top floor will be for general repairs and painting.

The garage and salesrooms of A. Vernon Hart, Rochester, N. Y., were badly damaged by fire recently, and several cars were scorched and otherwise injured. The estimated loss is $10,000. Mr. Hart handles the Thomas Flyer, Oakland and Columbus electric.

David J. Post, president of the Post & Lester Company and treasurer of the Veeder Mfg. Co., both of Hartford, Conn.

Kaeser & Wilbur, of West Hartford, Conn., have taken the agency for that vicinity of the Empire 20. The firm is located in a large garage on Farmington avenue, and has already made some desirable sales.

F. W. Conrad, of the Pacific Garage, Montesano, Wash., states that he used Diamond tires on a six-cylinder Franklin car, with an average considerably over nine thousand miles per tire.

---

### PERSONAL TRADE MENTION

The Carpenter Steel Company announces that Fred A. Bigelow, formerly its representative in New England, has assumed charge of its Cleveland branch at 1304 West Sixth street. This is to be taken as a sign of much activity around Cleveland, especially in connection with steel as it is used in automobile work.

Tom Moore, formerly secretary of the Cleveland park department, has become connected with the Vail Motor Sales Company, of Cleveland, and will have personal charge of the selling end of the Clark car, for which the company has just taken the agency. The Vail Company is also Cleveland agent for the Empire.

P. D. Wagoner has been elected president of the General Vehicle Company, Long Island City, N. Y., succeeding Howard Hanson, who has withdrawn from the company. Mr. Wagoner brings to his new work a wide experience in engineering and commercial affairs, and under his administration the outlook for the future of the General Vehicle Company appears very bright.

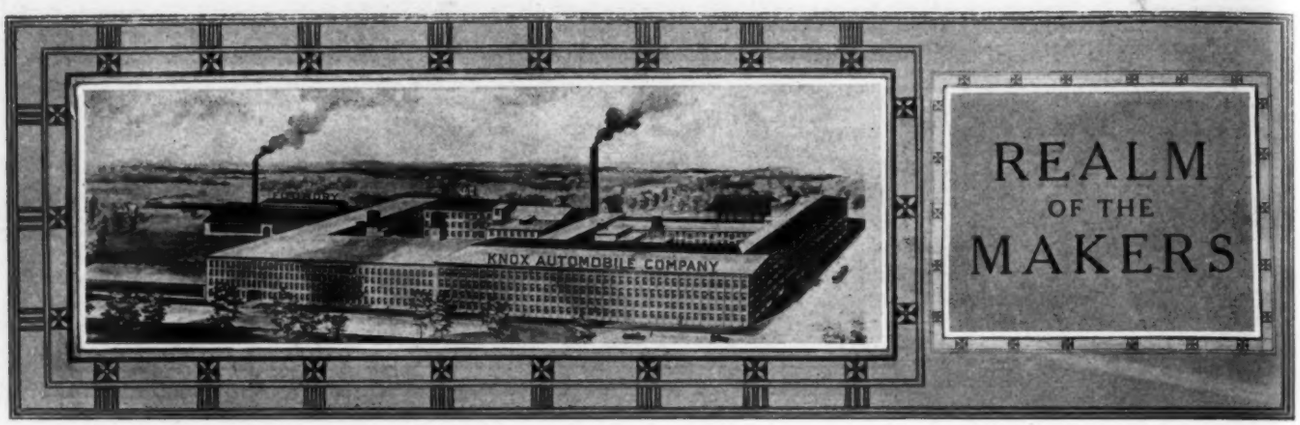
Albert L. Bennett has joined the Colt-Stratton Company, Broadway and Sixty-eighth street, New York City, in the capacity of sales manager. He will direct the sales of the Cole "30" and Paige-Detroit, both represented in this territory by the Colt-Stratton Company.

G. W. Stephens, formerly advertising manager of the G & J Tire Company, of Indianapolis, has severed his connection with that company, and will enter business for himself in Chicago. Mr. Stephens will handle tires and accessories, possibly locating on Michigan avenue.

T. C. Whitcomb, formerly Rambler agent at Cleveland, has accepted a position with the Overland Motor Car Company, at Toledo. He will become assistant to General Sales Manager F. A. Barker.

E. C. Johnson, formerly sales manager of the Philadelphia branch of the White and Packard companies, will become general sales manager of the Bergdoll Motor Car Company on March 15. Mr. Johnson is at present in Jamaica.

C. H. Foster, patentee of articles manufactured by the Gabriel Horn Mfg. Co., of Cleveland, will be succeeded by H. D. Preston as sales manager. Mr. Foster finds it necessary to devote more time to the manufacturing end of this increasing business.




The Knox Automobile Company has a large, modern plant in the suburbs of Springfield, Mass., a hustling Bay State town, which is celebrated for manufactures. The Knox factory is one of which any city, even Detroit, might be proud

Following a record month of production, in which not only the monthly but also the daily and every other Chalmers manufacturing record was broken, General Superintendent Reddig, of the Chalmers Motor Company, Thursday evening, tendered a dinner to 22 foremen and inspectors of the production dept.

The affair was a complete surprise to the men. Thursday morning H. L. Bill, assistant superintendent, spoke to each of the men, telling them to report in the office at 6 o'clock for a lecture from Mr. Redding. All were told to send word to their families that they might be kept late. Then, when all were assembled, they were led to waiting automobiles and whirled to Dobson's roadhouse, Grosse Pointe, where the dinner was served at 6:30.

Hugh Chalmers, president and general manager of the company, was called out of the city and so could not attend the dinner. A letter from him to the men was read by Mr. Reddig.

"The car luxurious"—a strikingly handsome landaulet body mounted on the 15-30 horsepower Stearns chassis, was one of the most attractive features of the immense automobile show in the Coliseum at Chicago recently. The comfortable and roomy body, attractively finished in whipcord, contained all the little luxuries so desired by those of good taste. Speaking tube, clock, note pad, cigar lighter, ash tray, interior electric light (Tungsten burner), toilet set, vanity case and other little conveniences united in producing one of the handsomest landaulets ever exhibited in the Windy City. This car, being a landaulet, opens in Summer, providing an ideal car for fair weather use. Practically the same body is furnished in the limousine type. The Stearns exhibit also embraced touring cars, toy tonneau runabouts and polished chassis of both the 15-30 and 30-60 models.

George Pope, treasurer of the Pope Mfg. Co., which makes the Pope-Hartford, a well-known New England product.

A two-cylinder Maxwell Junior climbed the front steps of the Tarrant County court house, Fort Worth, Tex., went through and glided down the north steps, in the presence of a crowd of 500 people, passing through the severe test without even a flattened tire, scratch or break of any kind. Tom Abbott, of the Mulkey Auto Company, drove the car and he with one passenger pronounced the climb and steep descent pleasant and comfortable. It is said that no other car has ever performed this feat, although a four-cylinder machine mounted the front steps, but stopped there.

The Thomas Motor Cab Co., Buffalo, is in full possession of the new plant at 1738 Elmwood avenue, which is devoted entirely to the manufacture of Thomas taxicabs. It is reported that the demand for Model G taxicabs is so pressing that the new facilities are just in time, and, under the better conditions now available, it is expected that the output will maintain some kind of a pace with the strong demand.

The Gabriel Auto Company has been incorporated under the laws of Ohio, and in addition to making a thirty-horsepower car, to be known as the Gabriel, will act as state agents for the K-R-I-T. The Grabowsky truck will also be added to the line. The company is an outgrowth of the W. H. Gabriel Carriage & Wagon Company, which has operated a large plant in Cleveland for years.

On or about June 1 the Fal Motor Co., of Chicago, will have a new factory ready for occupancy. This will give the company 250,000 square feet of much-needed floor space, with its own power plant, and, best of all, a half-mile testing track. When the new factory is occupied the company will gradually work into the manufacture of all parts going to make up the Fal-Car.

O. B. Henderson, sales manager of the Baker Motor Vehicle Company, states that sales for 1910 delivery show the greatest increase in the history of the business. The new shaft-drive models are the most popular, and it is said that agents for this car have nearly doubled their orders for 1910 over 1909.

The Pierce-Arrow Motor Car Company, of Buffalo, contrary to its custom, announces the placing on the market of the new model soon after the beginning of the year. It is said that owing to the necessity of time for the manufacturing of these cars, orders for them will not be accepted after April 1.

It is said that during the coming year George Robertson, the noted racing pilot, will use Continental tires and demountable rims on various cars he will drive.


Systematic and economical organization is the keynote in all modern automobile plants, and is necessary no less in the administrative offices than in the workshops. This is a view of the Goodrich Boston branch.

Members of the Maryland Legislature have taken a number of exceptions to the automobile bill prepared by Col. Sherlock Swann for the Automobile Commission. A number of the legislators object to the provision for the Motor Vehicle Commissioner at $3,000 a year. It is said that these objections are made upon the ground that it seems that the salary of the Secretary of State, who they believe to be a greatly underpaid official, should be increased, and by amending the bill this can be done, provided no Motor Vehicle Commissioner is appointed.

From Los Angeles comes a report that arrangements have been made whereby Ralph De Palma will in the future pilot a 200-horsepower Fiat car owned by W. C. Arnold. The next appearance of the speed monster with De Palma at the wheel will be at the inaugural meet of the new board motordrome near Los Angeles. In view of this, it is possible that Oldfield and his Benz may be matched with the Fiat, although, as previously noted, negotiations in this direction are for the time being suspended.

Lieutenant Shackleton, the British South Pole seeker, is an ardent motorist. During his recent journey into the unknown South he used an automobile, and in a coming lecture in New York he expects to make public some of the details in this particular. Benj. Briscoe, president of the Maxwell-Briscoe Motor Company, has expressed a desire to build for the lieutenant a car which will surmount all possible difficulties of the polar journey.

The Delaware Aero Club has been incorporated under the laws of Delaware, with a capital of $100,000, by the following: David Snellenburg, George W. Crowe, Grantley P. Posteles, William L. Dockstader, John A. Montgomery, John G. Gray and Robie Seidlinger, all of Wilmington. Mr. Seidlinger has invented an aeroplane which it is proposed to build and test, and if it proves a success it will be exploited.

The Folsom Manufacturing Company, South Bend, Ind., maker of automobile accessories, has contracts with the Moon Motor Company, of St. Louis; Haynes, of Kokomo; Buckeye, Rider-Lewis and a number of other companies, for under-pans, tanks, and other sheet metal work for automobiles.

A. Leubner & Son, liverymen at Wausau, Wis., have decided to add several automobiles to their equipment, realizing that the horse-drawn vehicle is fast passing. Two cars are being used at the start, but the demand for the self-propelled vehicles is so great that more must be added.

The Pittsburg Automobile Academy is a new school for drivers at 6211 Howe street. W. H. Schmitz, president of the company, is an old Pittsburg automobile dealer, and H. P. Johnston, former automobile editor of the Pittsburg *Press*, is also connected with the school.

The Todd Rubber Company, Hartford, Conn., has removed from 30 Church street to 279 Trumbull street to more commodious and central quarters. Aside from the repair of tires a general accessory business is done.

The Silent-Motor Car Company, of Pittsburg, Pa., has been formed by Carl C. Conkle, Pittsburg, Pa.; Julius Sturtevant, New Kensington, Pa.; John W. Maesch, Beaver Falls, Pa., and G. W. Dorsey, Jr., of Wilmington, Del. It has a capital of $300,000, and will manufacture automobile parts.

The Great Western "30" will be entered in a large number of track races and hill climbs during the coming season. F. B. Thornburgh, the representative of Wheeler & Schebler, will drive.

The Pittsburg Auto Equipment Company, of Pittsburg, has bought the entire plant of the Union Auto Repair Company, on Collins avenue, East End, whose wind shield it has been selling for six months.

The Derain Motor Company, of Cleveland, has increased its capital stock from $40,000 to $60,000 by papers filed with the Secretary of State recently.

The Schoellkopf Auto Radiator Company, of Cleveland, has been incorporated with a capital stock of $25,000 by William Schoellkopf and others.

The Queen City Motor Car Company, of Cincinnati, has been incorporated with a capital stock of $10,000 by F. M. Bering and others.

The Cleveland Auto Trading Company, of Cleveland, has been incorporated with a capital of $5,000 by C. K. Halle and others.

Alfred Reeves, late of the American Motor Car Manufacturers' Association, now general manager of the A. L. A. M.

# PROMINENT ACCESSORIES

The Diamond Chain & Mfg. Co. calls attention to the new method of housing and adjusting the double Diamond chain drives of 1910 Chadwick cars as a most practical arrangement for making chains give good service.

The radius rod, which is a manganese bronze casting, forms the greater portion of the inside of the case and is provided with a slide to permit chain adjustment. The centers of the radius rod are respectively the centers of the jack shaft and rear axle, so that there is no tightening or loosening of the chain from the up-and-down spring movement, and the chain can be correctly adjusted at any position of the springs. This construction has another advantage in that the case can be built very narrow without the danger of side slapping and its attendant noise.

Link of Diamond chain

A special Diamond chrome nickel steel chain is used and the sprockets are shaped to avoid "buzz" as the chain rollers strike the teeth. This noise is usually caused by insufficient lubrication after the chain has become filled with dust and dirt. The chains of a Chadwick car are first adjusted to make the drive as nearly noiseless as possible and are then lubricated with a heavy grease, which the case retains.

The addition of the aluminum cases tends to muffle the noise still further. A felt washer where the case encloses the rear wheel drum further prevents dust from reaching the chains.

The chain drives of Chadwick cars enable the use of an I-beam section rear axle which is enormously strong and very light in weight, the differential being placed up in the car in order to load the springs and promote easy riding. With this construction the heavy dead weight of the differential is not directly supported by the rear tires, a feature which materially decreases tire troubles and expense.

The direct forward pull from the top of the sprockets on each side also gives easier riding qualities than the tipping action in shaft-driven cars. Further it is impossible for road shocks or obstructions to throw the rear axle out of alignment, which may happen in shaft-driven cars with a consequent power loss.


DeLuxe gas tip burner

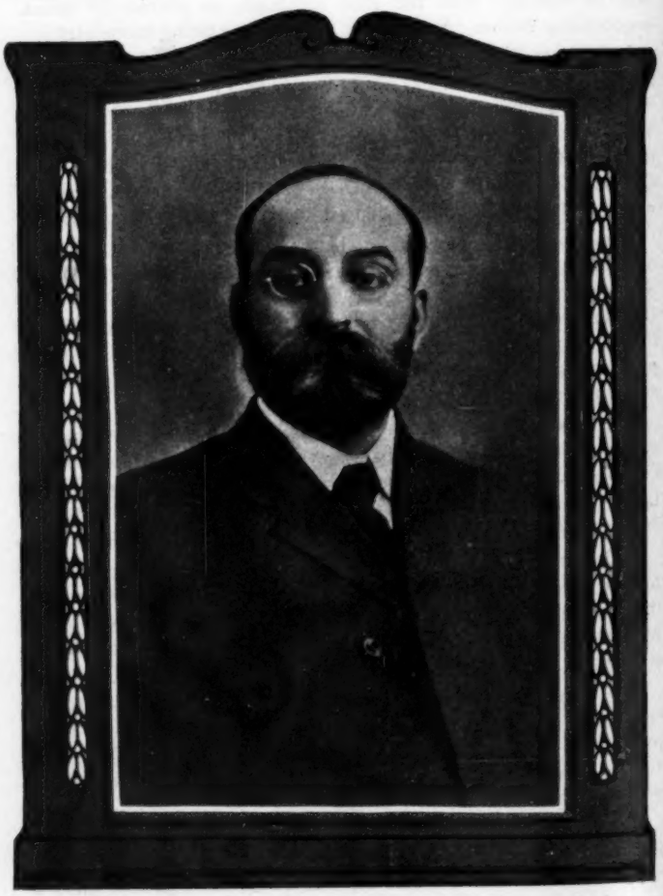
Prominent among the acetylene burners on the market is the Alco, which is not connected with the automobile of that name, but is the product of the American Lava Company, of Chattanooga, Tenn. This embodies the usual principles of acetylene burners; that is, it is forked in shape, with a passage for the gas in each branch, so arranged that the two streams of gas impinge on each other to give a fan-shaped flame. The gas passages are slightly enlarged at their ends and have holes drilled in to admit air, so that the gas is diluted or mixed with part of the air necessary before it issues from the nozzles.

The pillars of the jets are turned from solid brass, heavily nickel plated. The burner proper, the branched part, is screwed into the pillar and is cemented in place, so as to make leaks absolutely impossible. The burner is made of genuine Nuremberg steatite, which is the best and most reliable material for the purpose.

Volier horn, a new variety

The 1910 models of the Volier horns, formerly handled by the American Brass Products Company, of Hartford, Conn., are now made by that company in its American factory in accordance with French methods. This horn is claimed by the maker to mark the perfection of graceful design; in both finish and workmanship it is equal to the best French product.

The most favored model is the double-turn horn, the double-turn feature of design making the note very deep and musical. This quality makes them a dangerous competitor of the recently invented mechanical horns and sirens, which otherwise would have a clear field for automobiles intended for touring. It takes a good loud noise to clear the road in many cases, and the double-turn horn is the only one of the bulb-operated variety that is capable of producing it. All Volier horns are fitted with chemically cured bulbs and with reeds of a special non-corrosive metal. The horn proper is of spun brass of sufficiently heavy section, and the five pieces are securely joined together. The horn is made in the usual styles, with or without the flexible tube.



E. E. Sweet, engineer for the Cadillac Motor Car Company